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Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

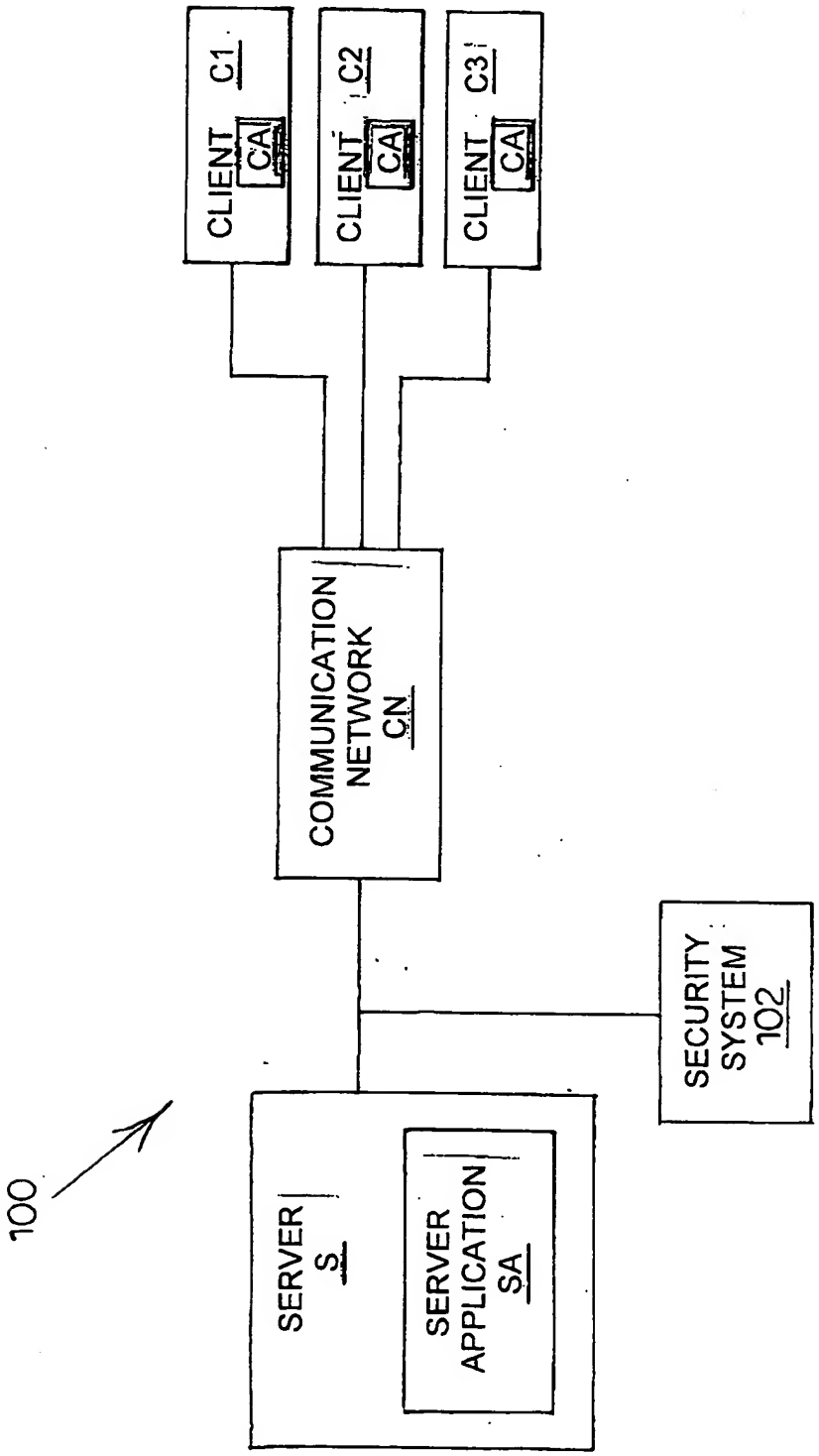


FIG. 1A

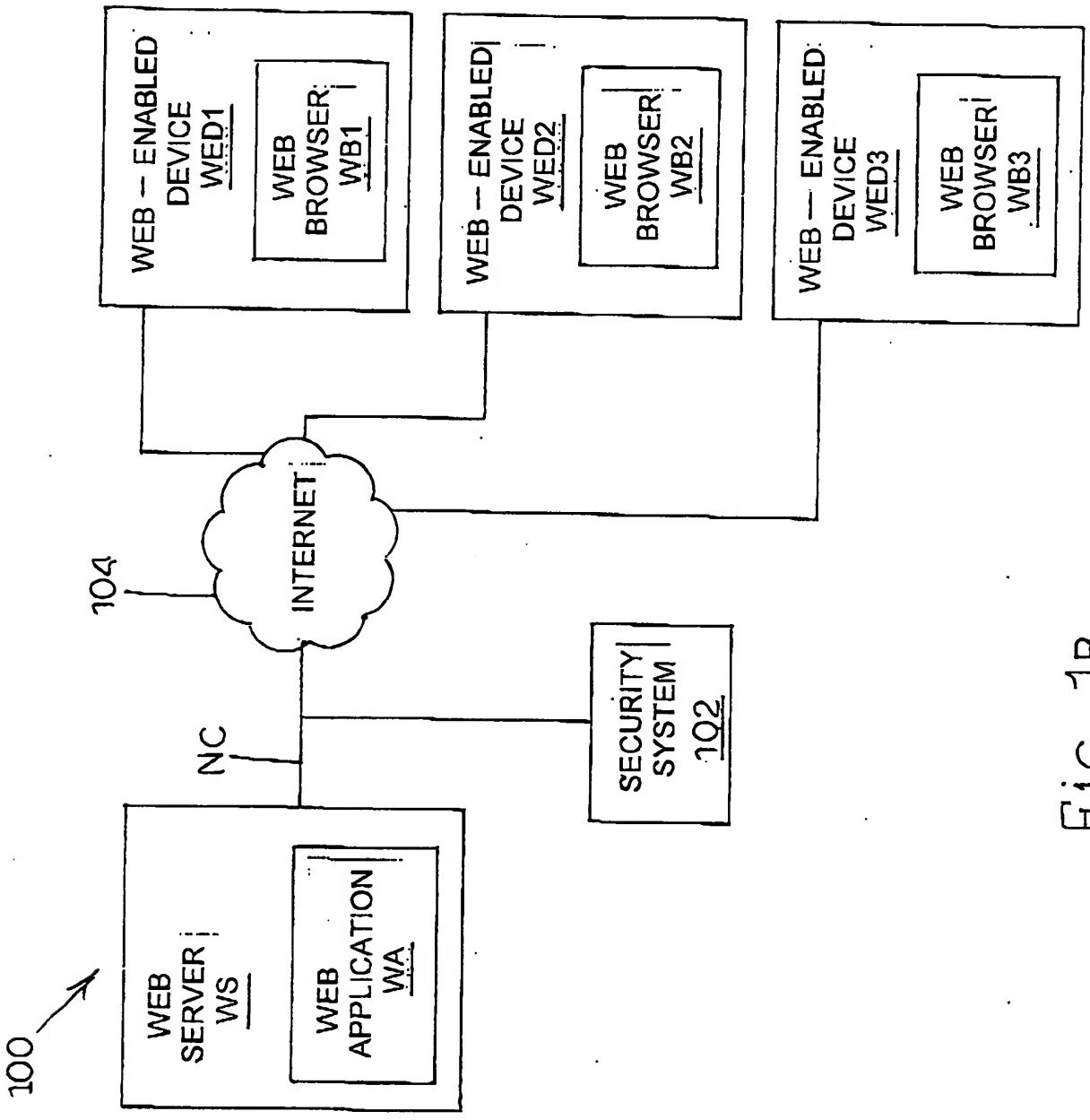
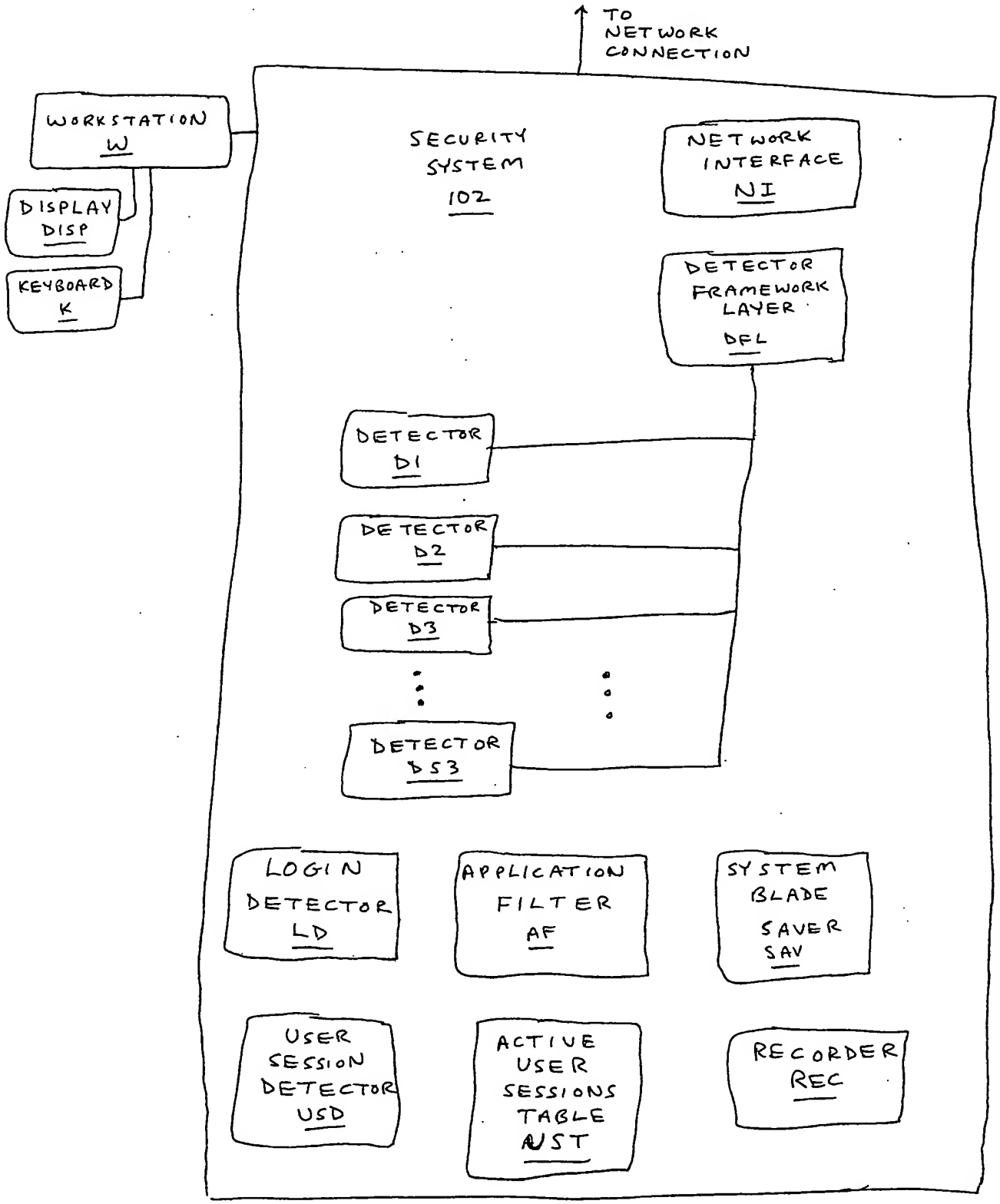

WEB – ENABLED DEVICE WED1
WEB BROWSER WB1
WEB – ENABLED DEVICE WED2
WEB BROWSER WB2
WEB – ENABLED DEVICE WED3
WEB BROWSER WB3
INTERNET
104
SECURITY SYSTEM 102
NC
WEB SERVER WS
WEB APPLICATION WA
100

FIG. 1B

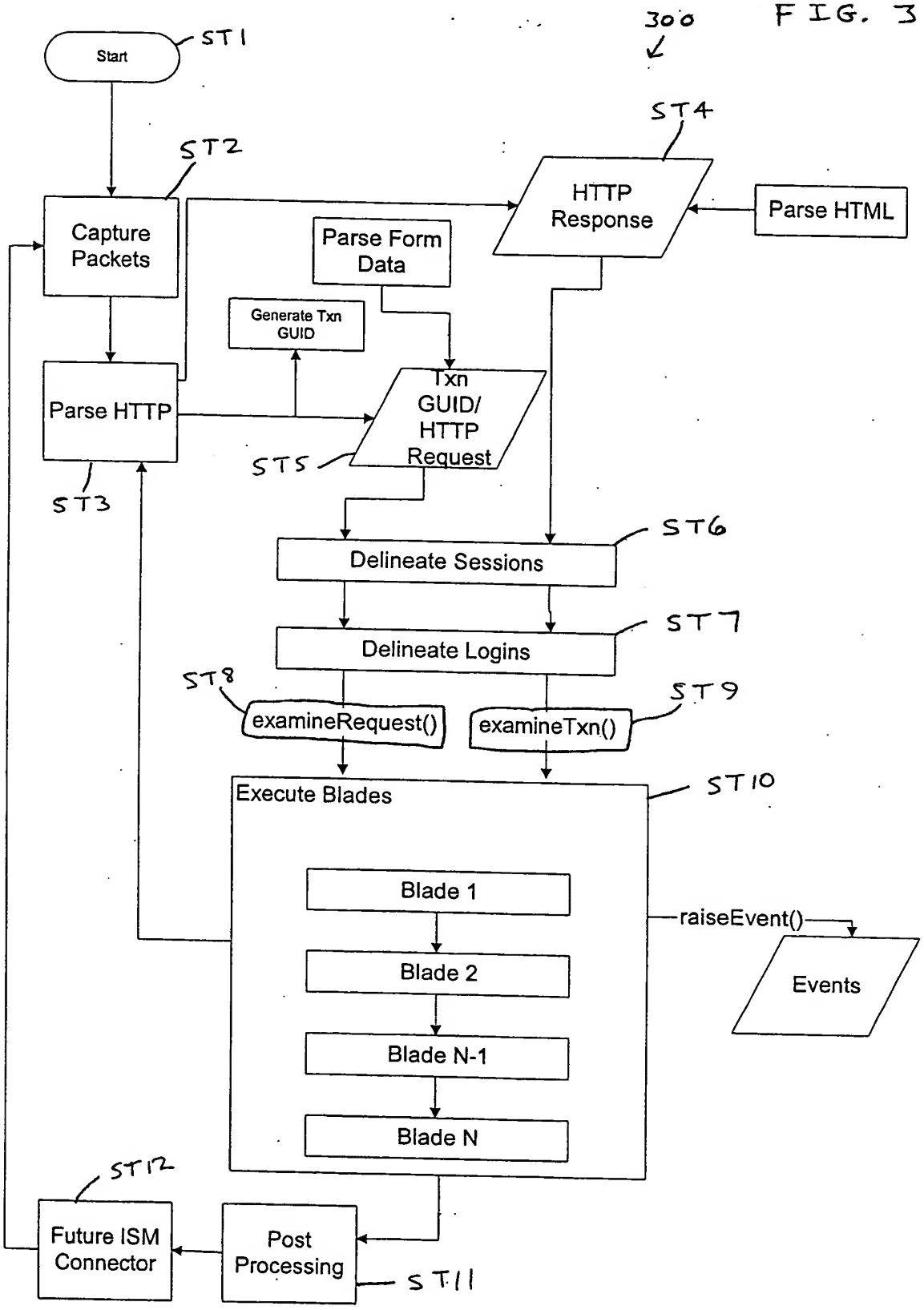
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 2



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 3



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Atty Docket: 1503/9

FIG. 4

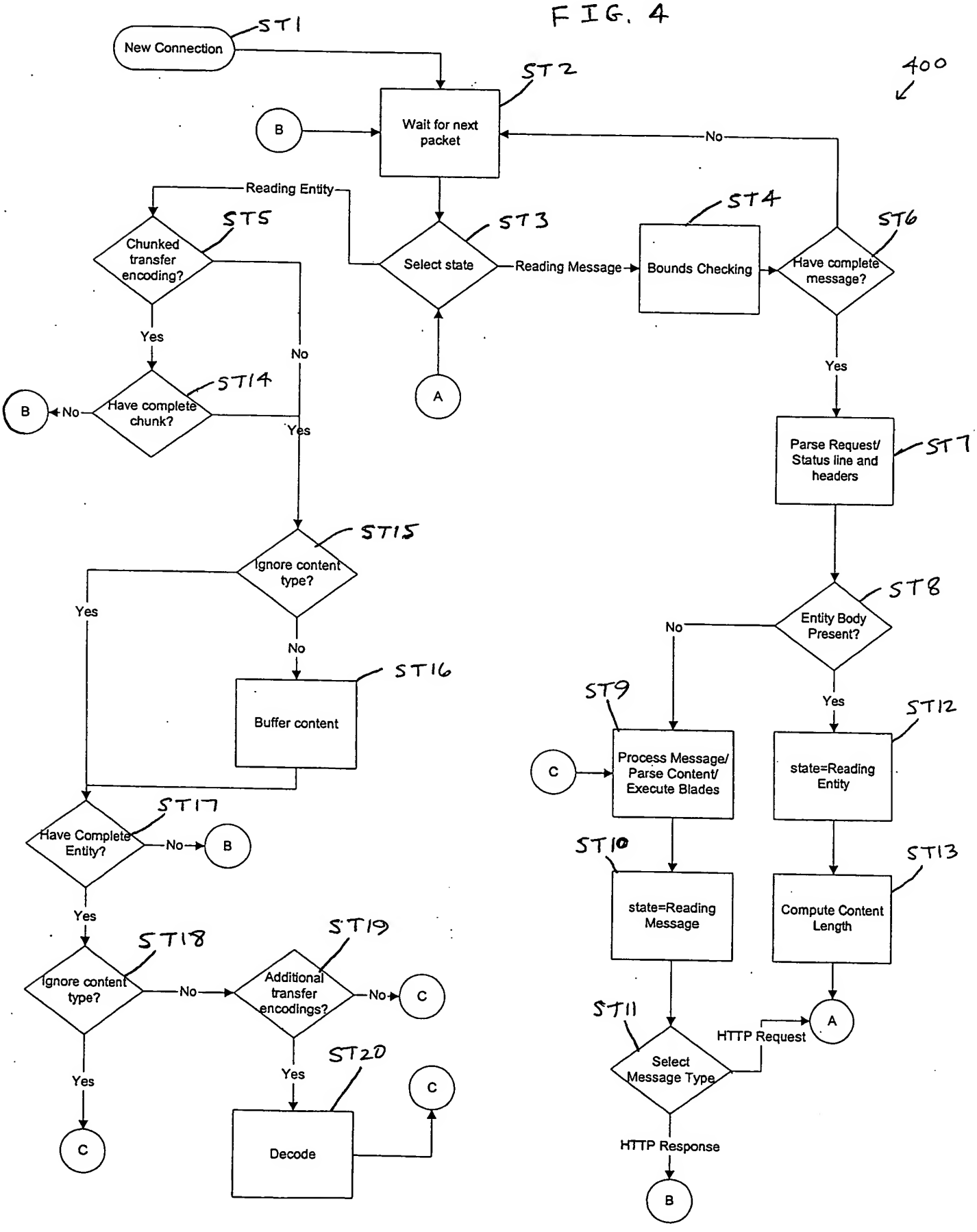

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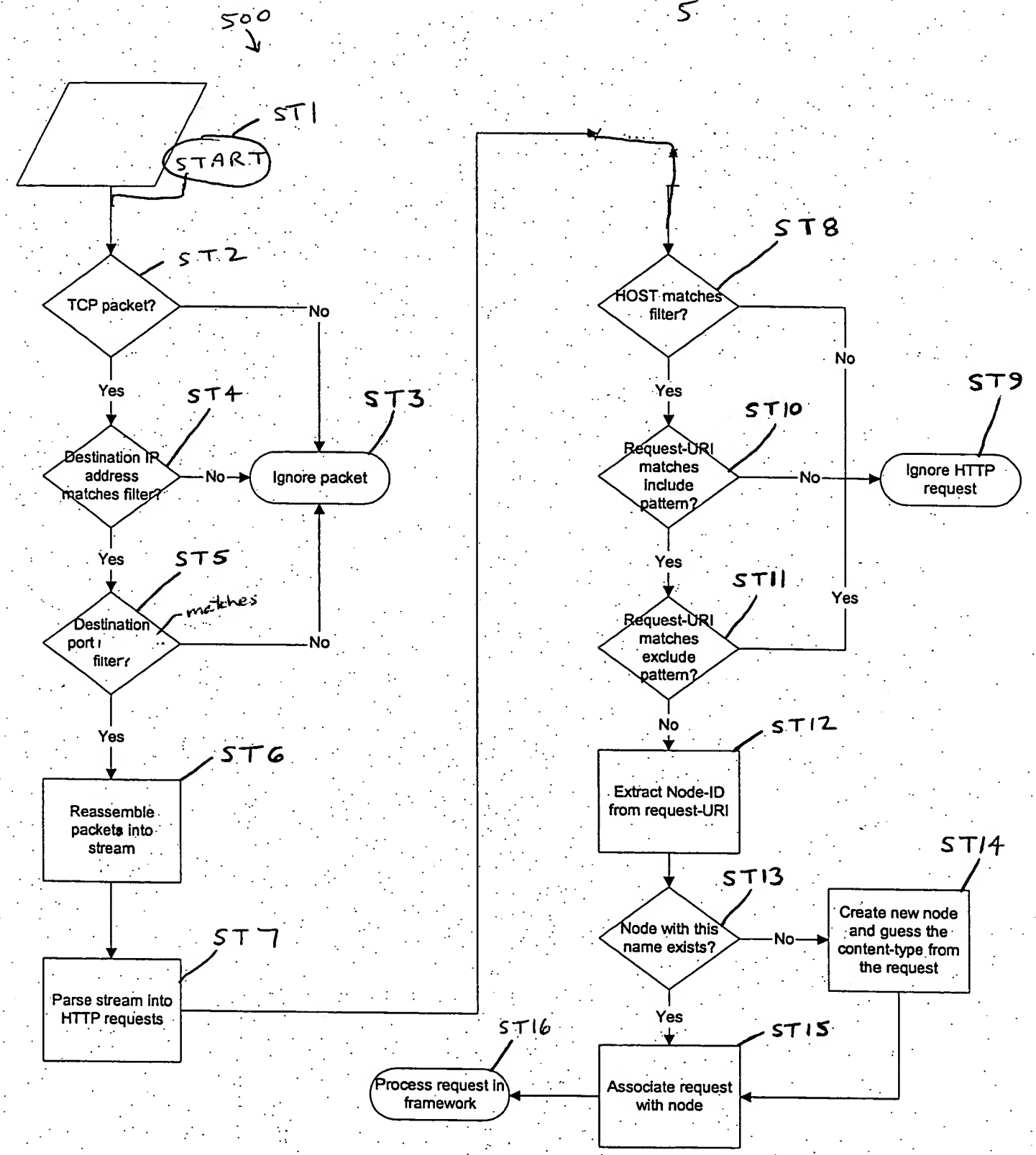
FIG. 5



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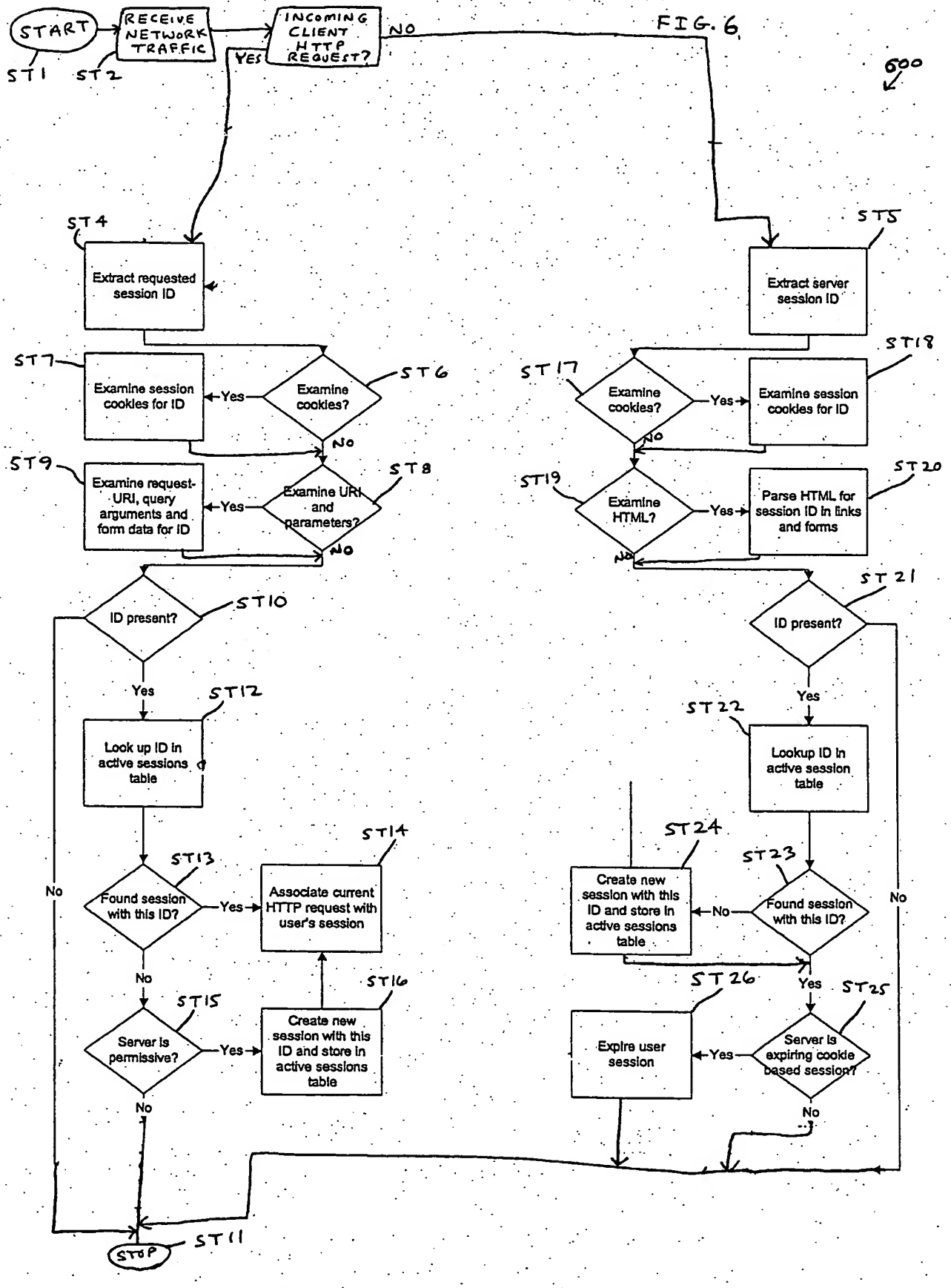
Atty Docket: 1503/9

FIG. 6



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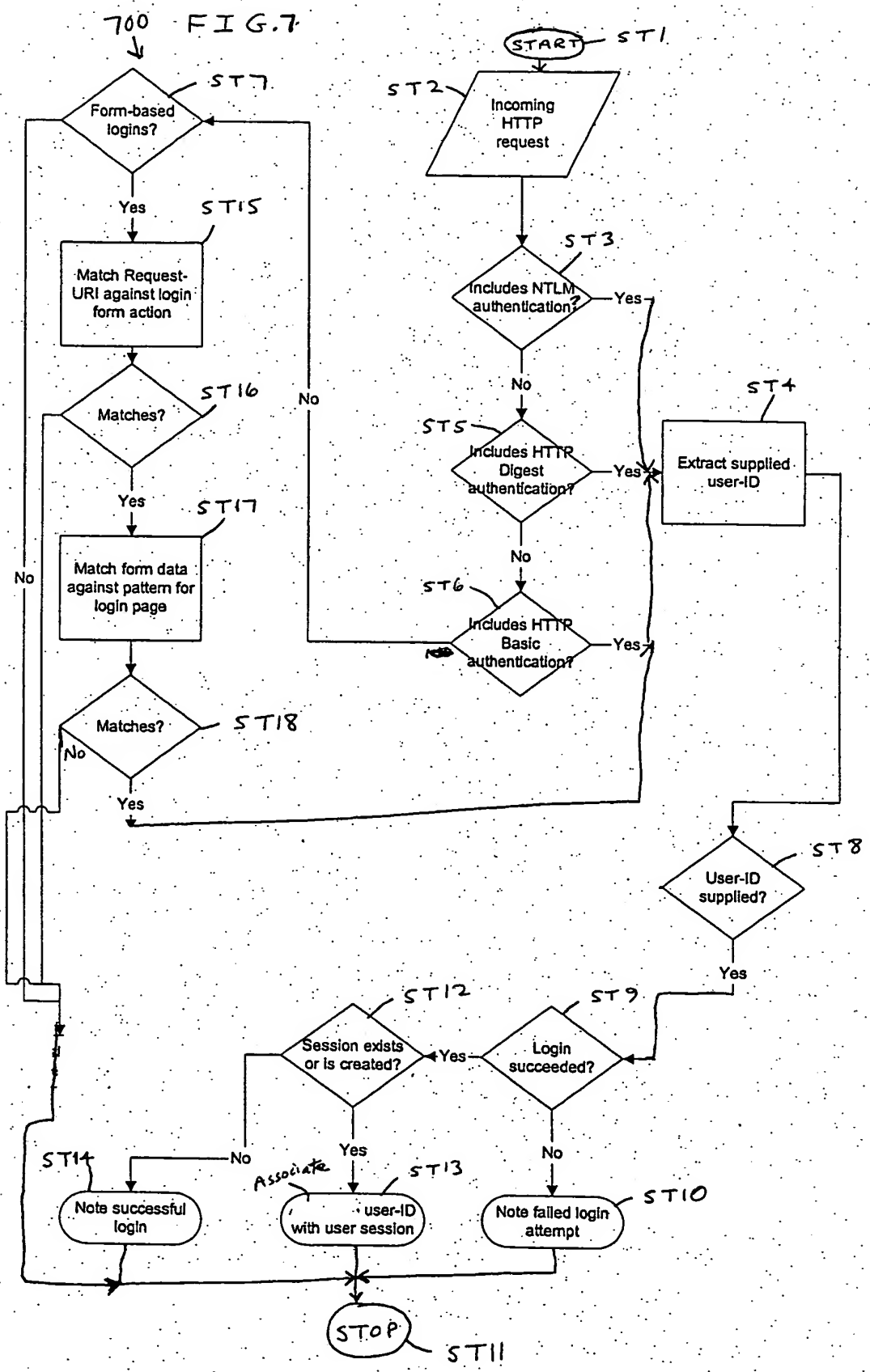


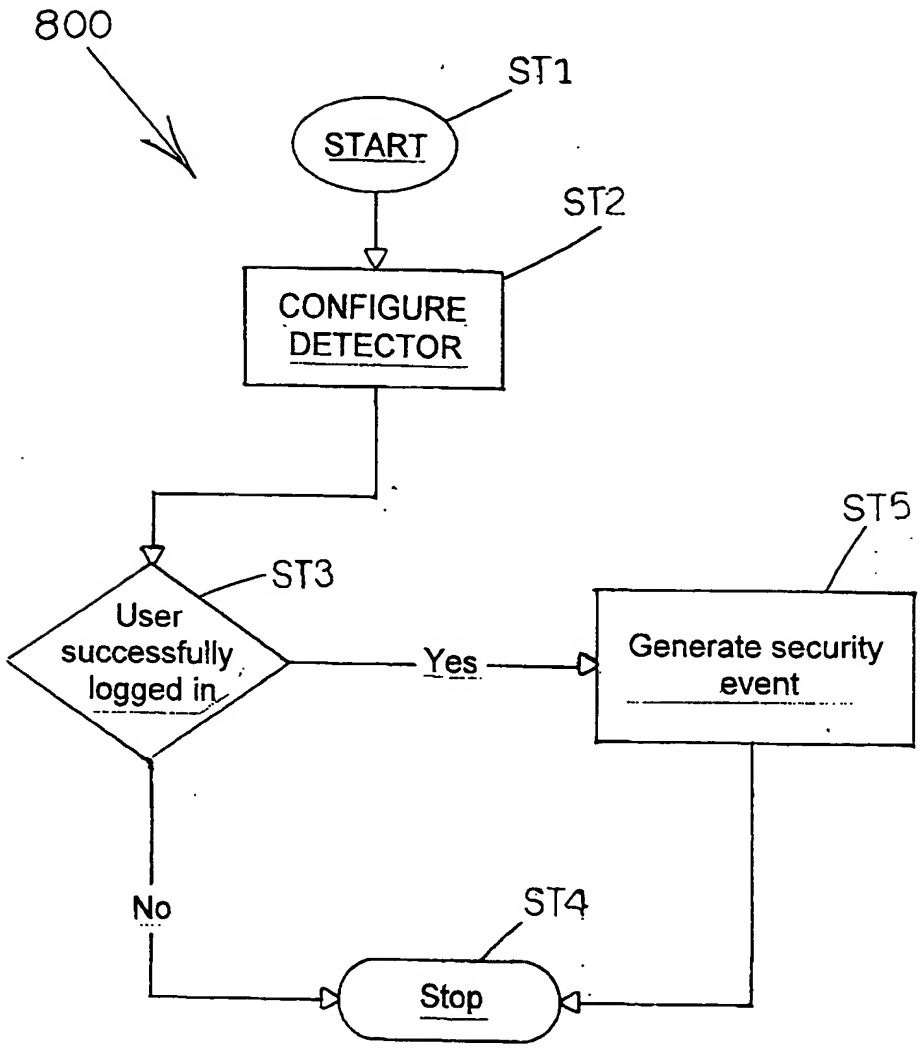

800
ST1
START
ST2
CONFIGURE DETECTOR
ST3
User successfully logged in
Yes
ST5
Generate security event
No
ST4
Stop

Fig. 8

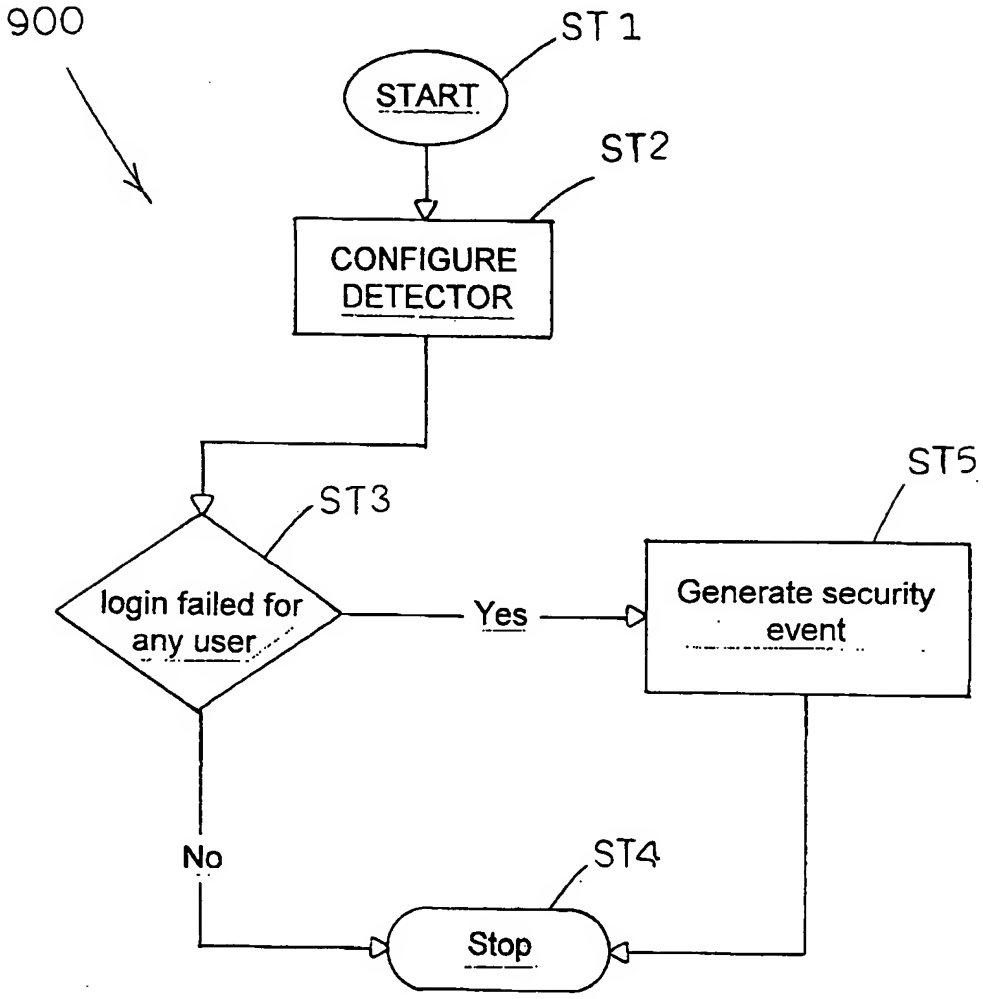

900
ST 1
START
ST2
CONFIGURE DETECTOR
ST3
login failed for any user
Yes
ST5
Generate security event
No
ST4
Stop

Fig. 9

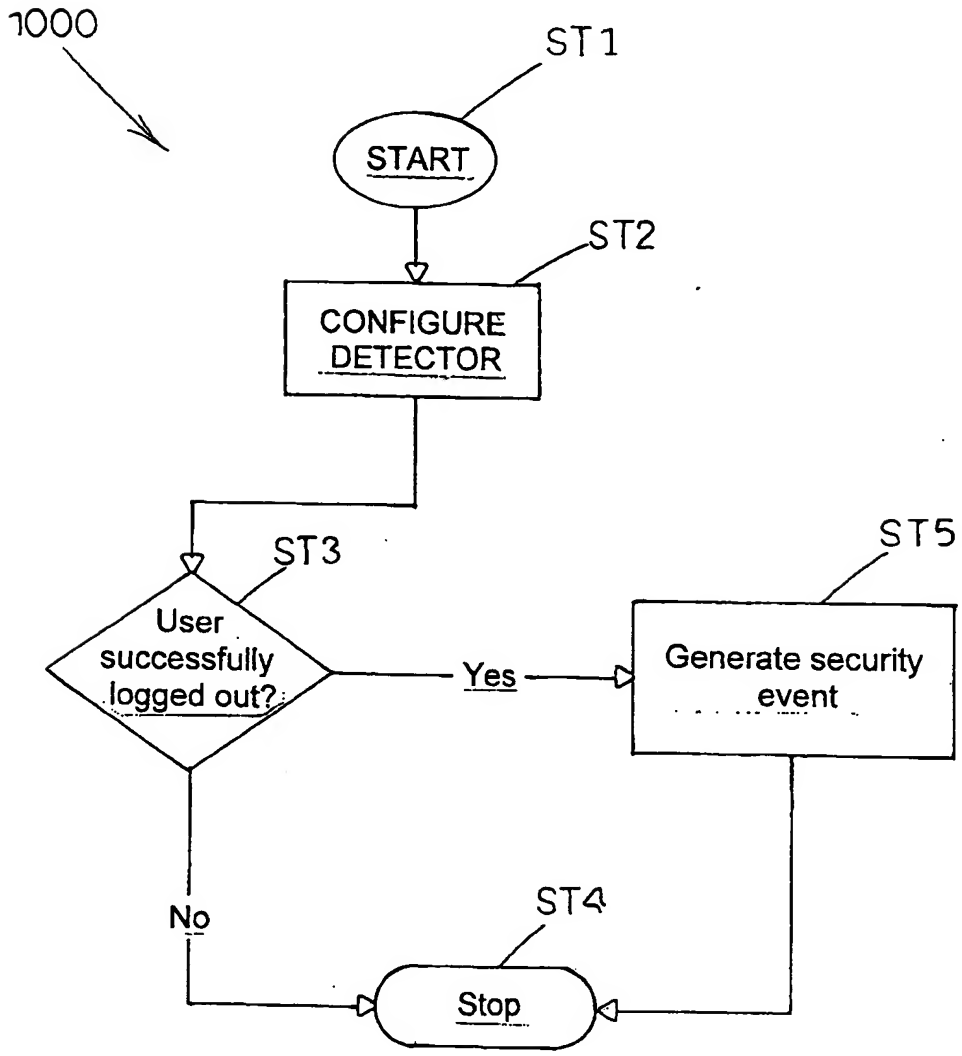

1000
ST1
START
ST2
CONFIGURE DETECTOR
ST3
User successfully logged out?
Yes
ST5
Generate security event
No
ST4
Stop

Fig. 10

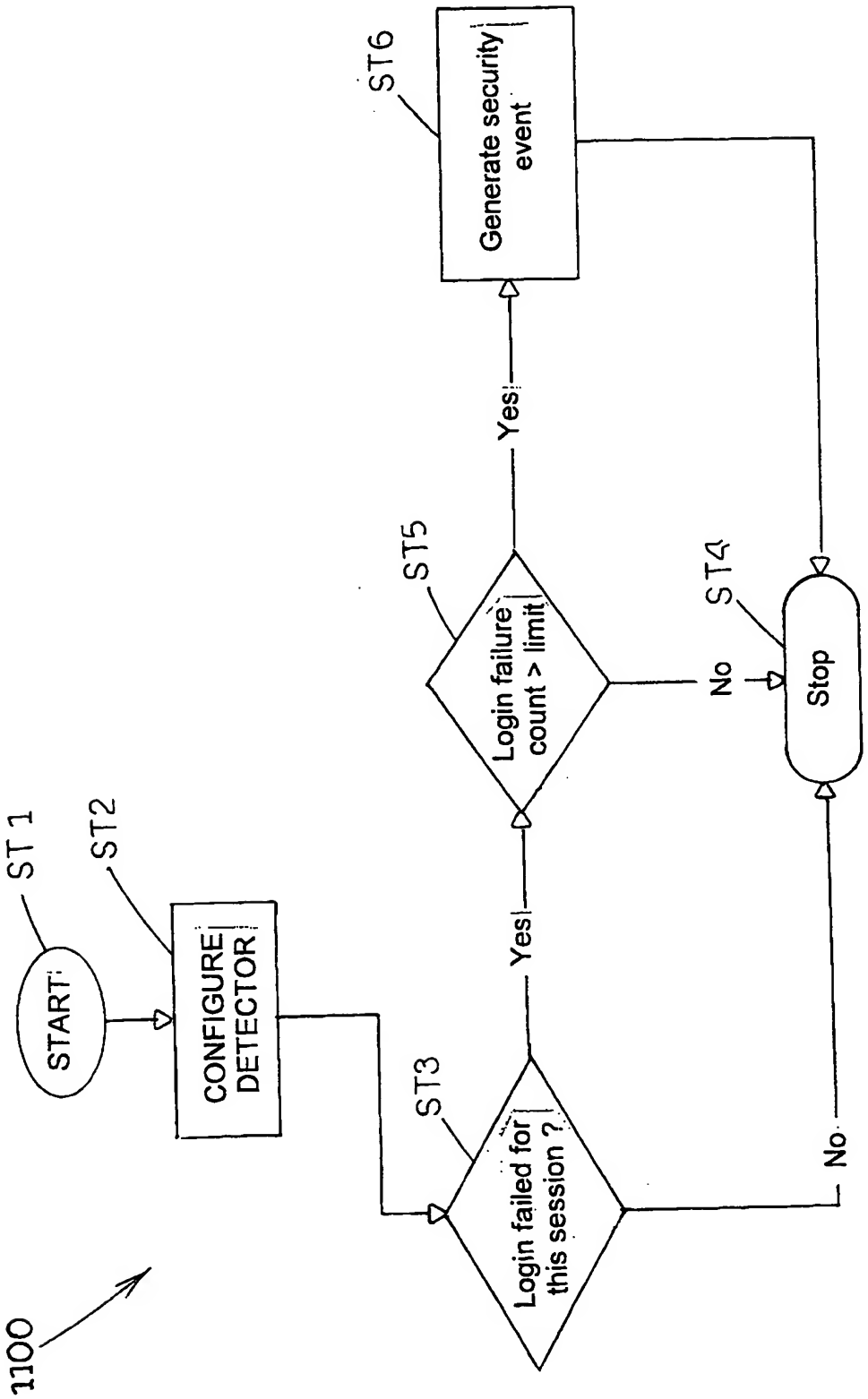

1100
START
ST 1
CONFIGURE DETECTOR
ST2
Login failed for this session ?
ST3
Yes
No
Login failure count > limit
ST5
Yes
No
Stop
ST4
Generate security event
ST6

FIG. 11

Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

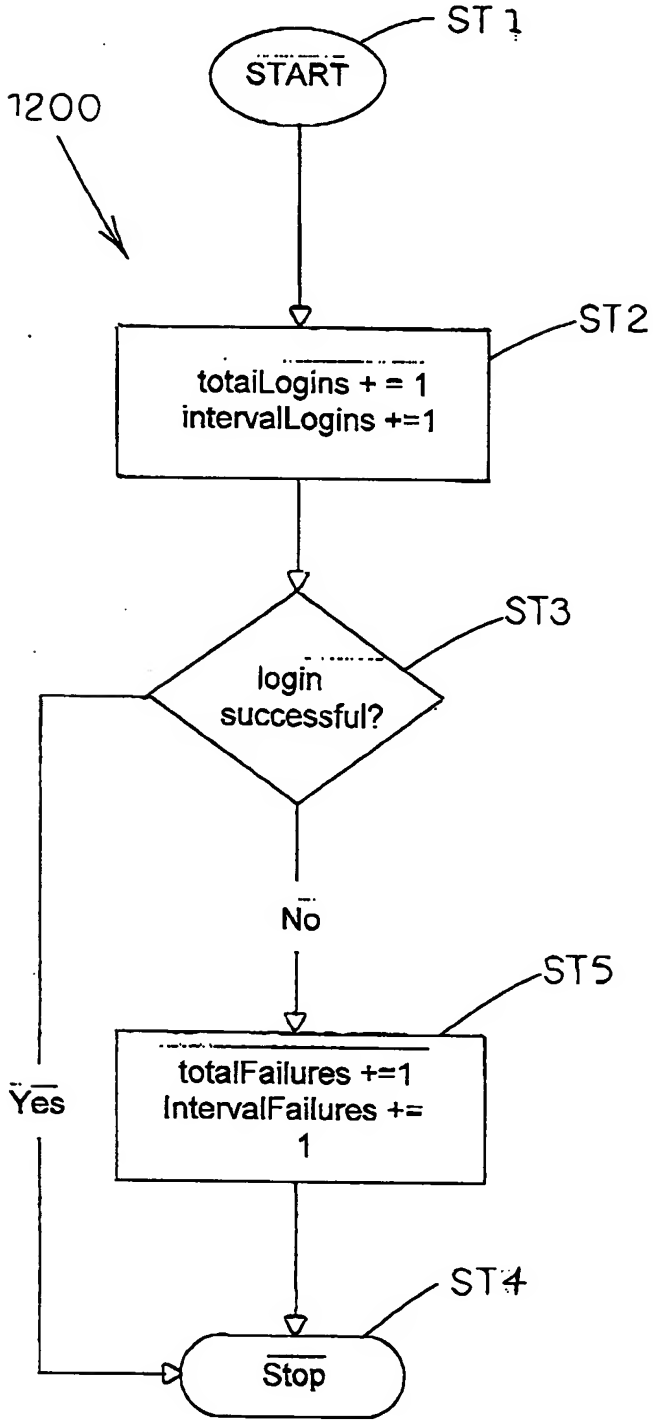


Fig. 12A

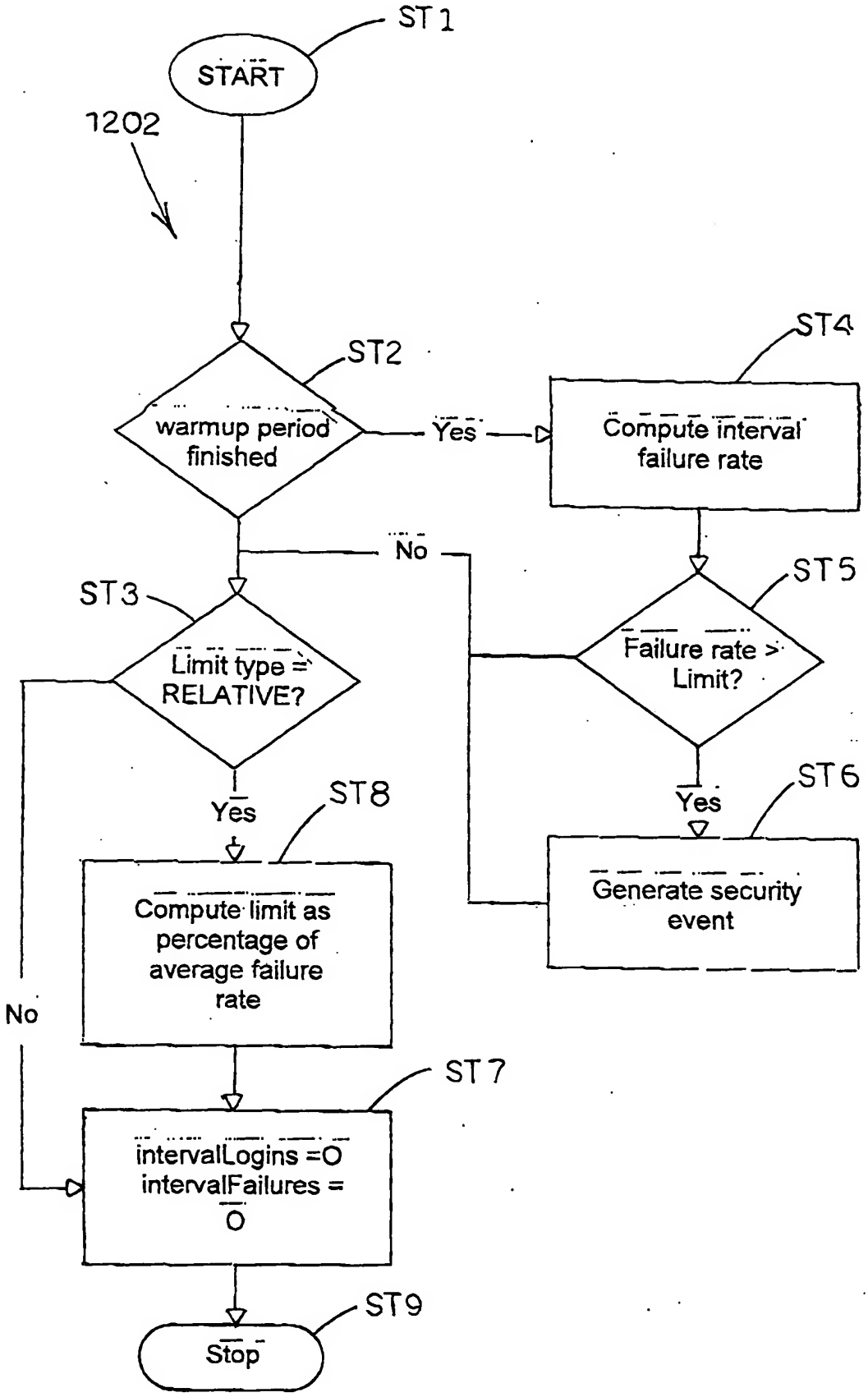

ST1
START
1202
ST2
warmup period finished
Yes
ST4
Compute interval failure rate
No
ST3
Limit type = RELATIVE?
ST5
Failure rate > Limit?
Yes
ST6
Generate security event
Yes
ST8
Compute limit as percentage of average failure rate
No
ST7
intervalLogins =0
intervalFailures = 0
ST9
Stop

Fig. 12B

Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

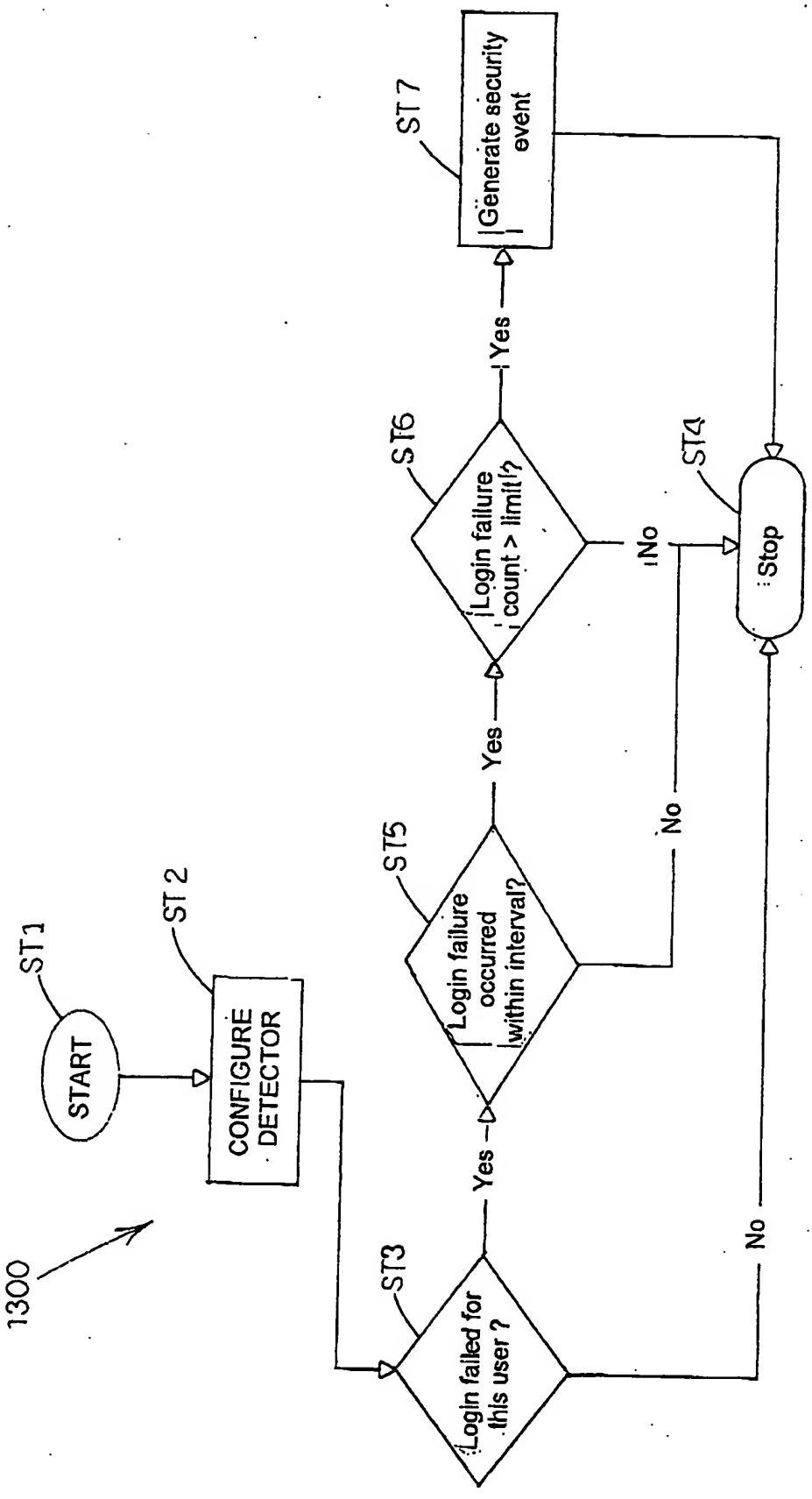


FIG. 13

Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

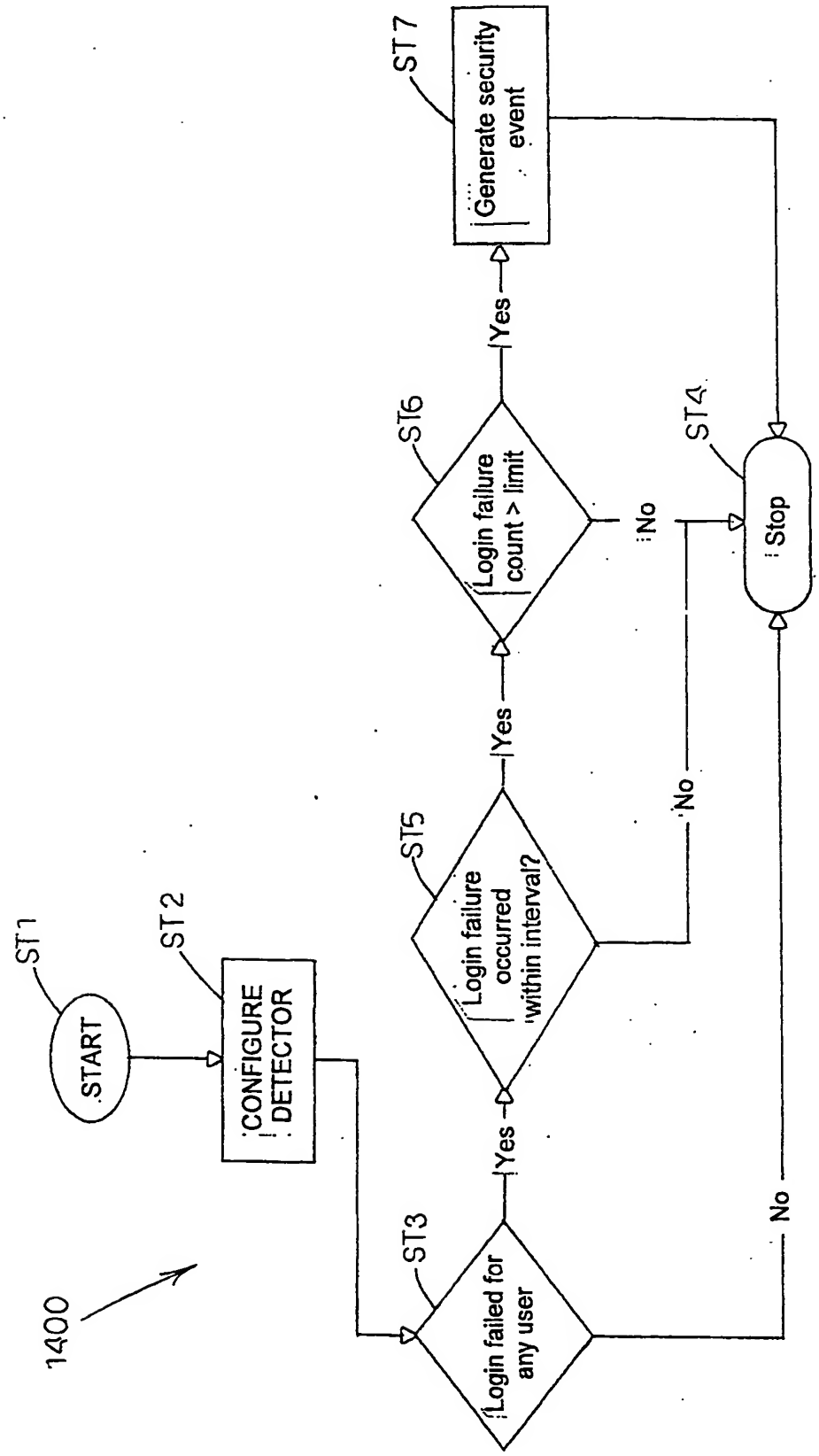


FIG. 14

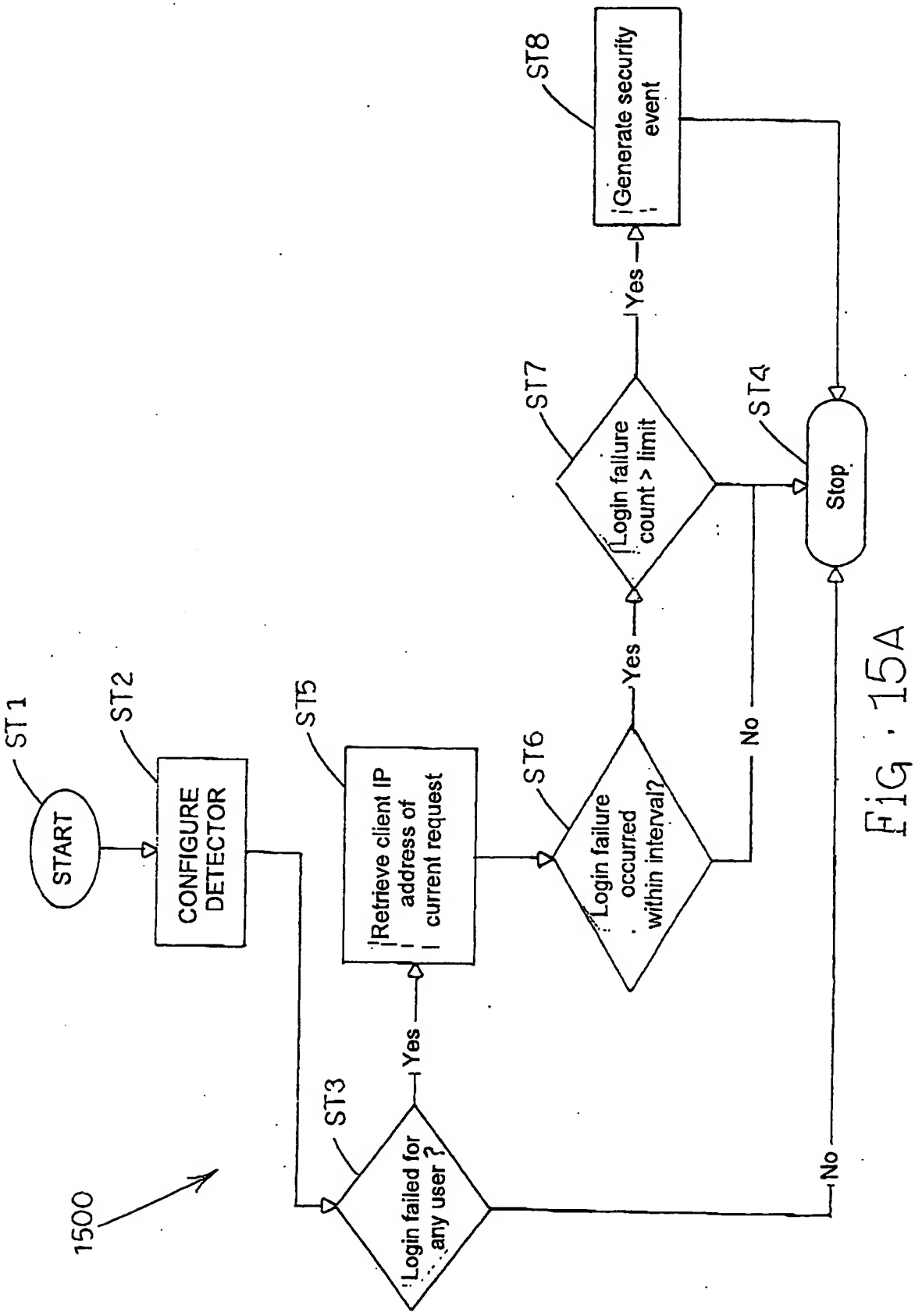

1500
START
ST1
CONFIGURE DETECTOR
ST2
Login failed for any user ?
ST3
Yes
No
Retrieve client IP address of current request
ST5
Login failure occurred within interval?
ST6
Yes
No
Login failure count > limit
ST7
Yes
No
Generate security event
ST8
Stop
ST4

FIG. 15A

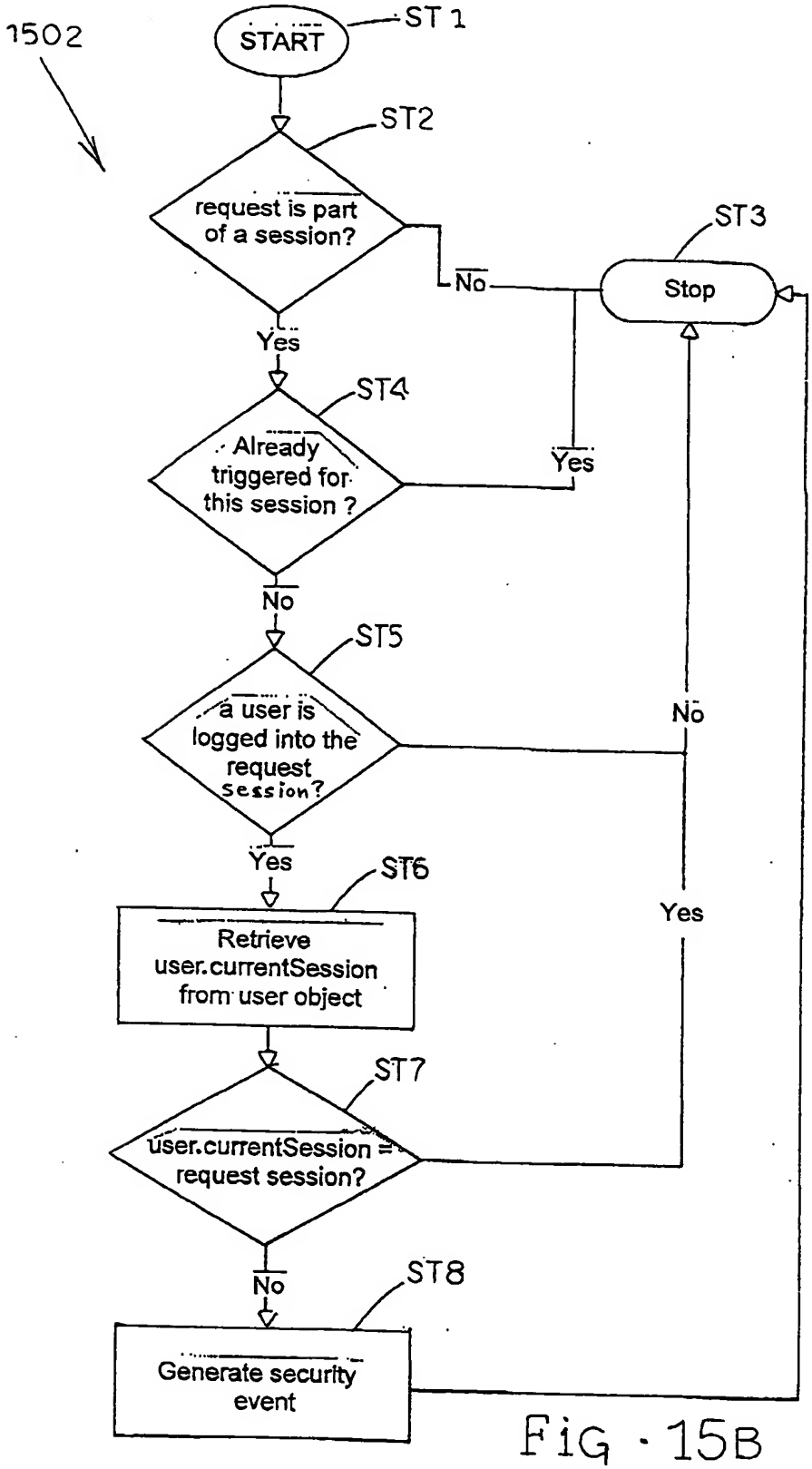

1502
START
ST 1
ST2
request is part of a session?
No
ST3
Stop
Yes
ST4
Already triggered for this session ?
Yes
No
ST5
a user is logged into the request session?
No
Yes
ST6
Retrieve user.currentSession from user object
ST7
user.currentSession = request session?
No
ST8
Generate security event

FIG · 15B

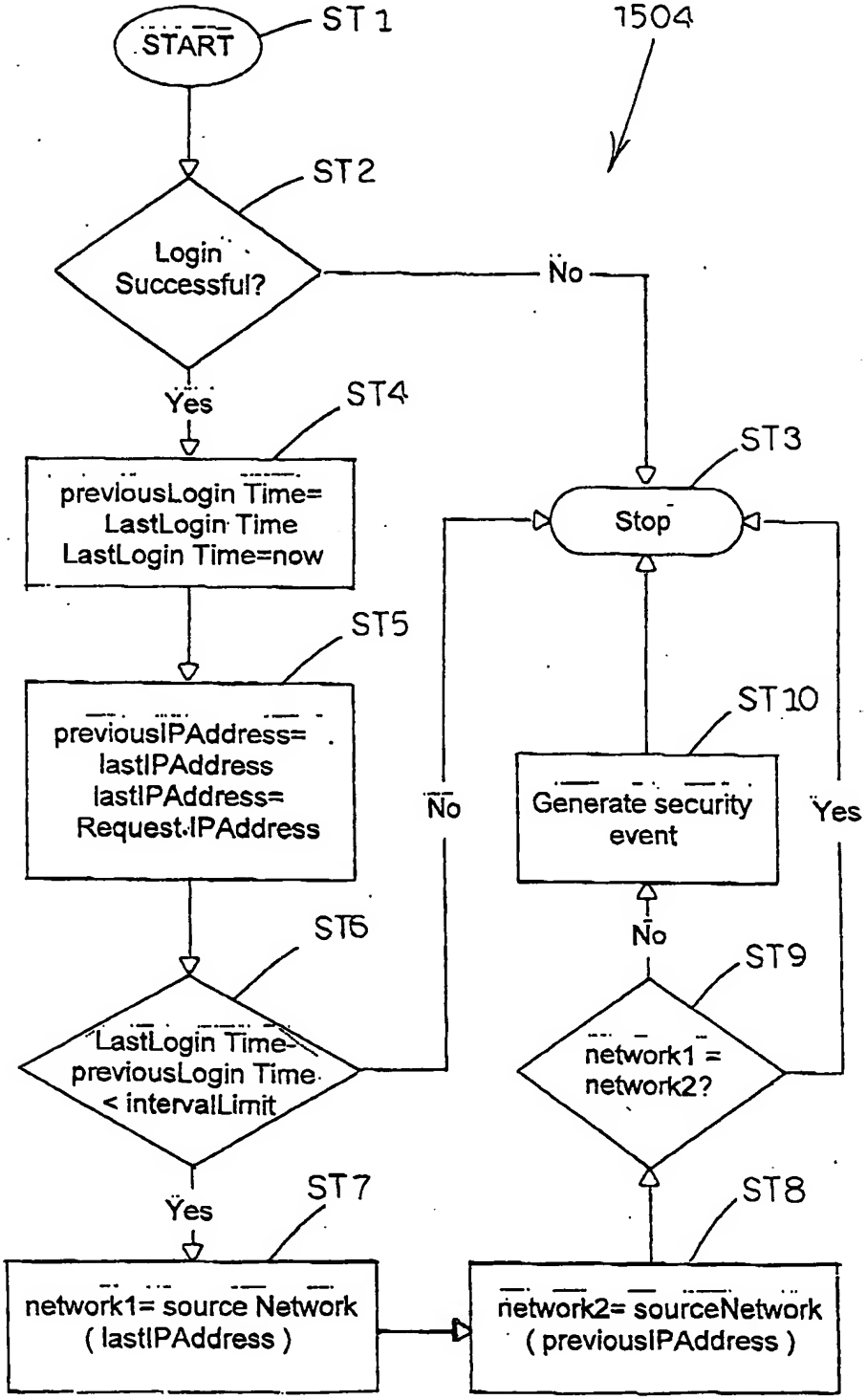
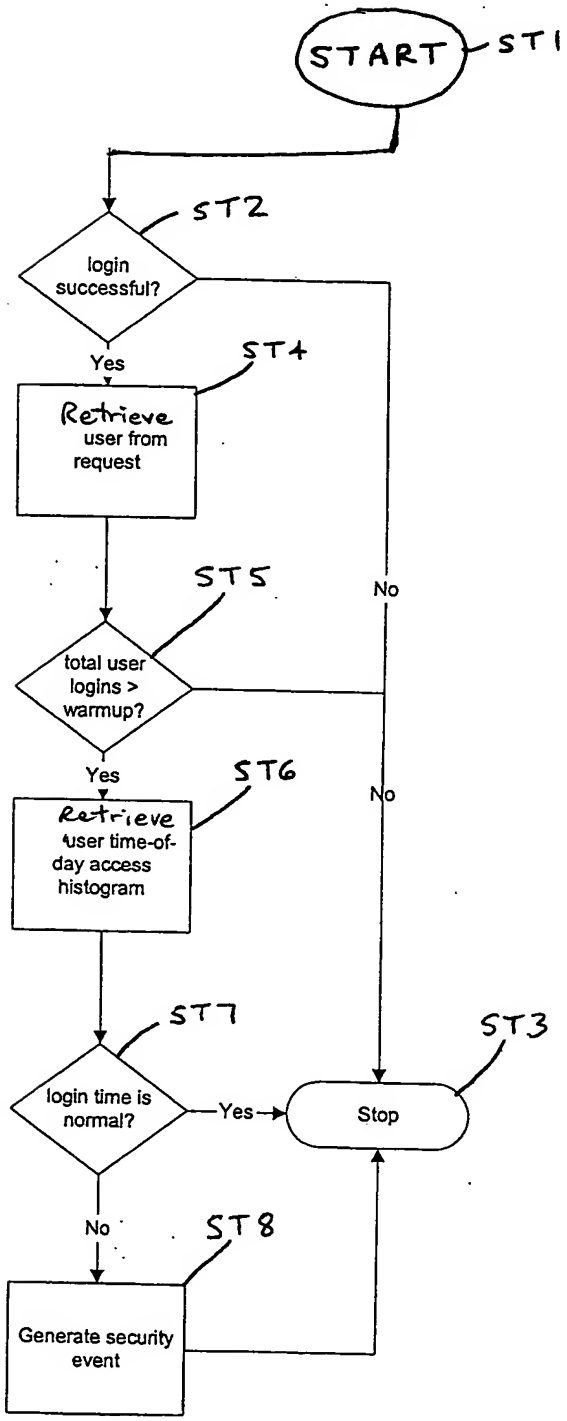

START
ST1
1504
ST2
Login Successful?
No
Yes
ST4
previousLogin Time= LastLogin Time
LastLogin Time=now
ST3
Stop
ST5
previousIPAddress= lastIPAddress
lastIPAddress= Request.IPAddress
ST10
Generate security event
No
Yes
ST6
LastLogin Time- previousLogin Time < intervalLimit
No
ST9
network1 = network2?
Yes
ST7
ST8
network1= source Network (lastIPAddress)
network2= sourceNetwork (previousIPAddress)

Fig. 15c

Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

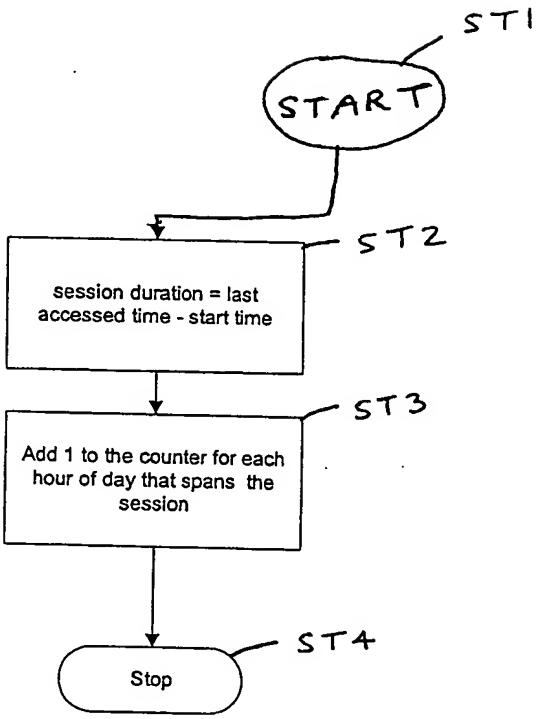
1600

FIG. 16A



1602

FIG. 16B



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 17A

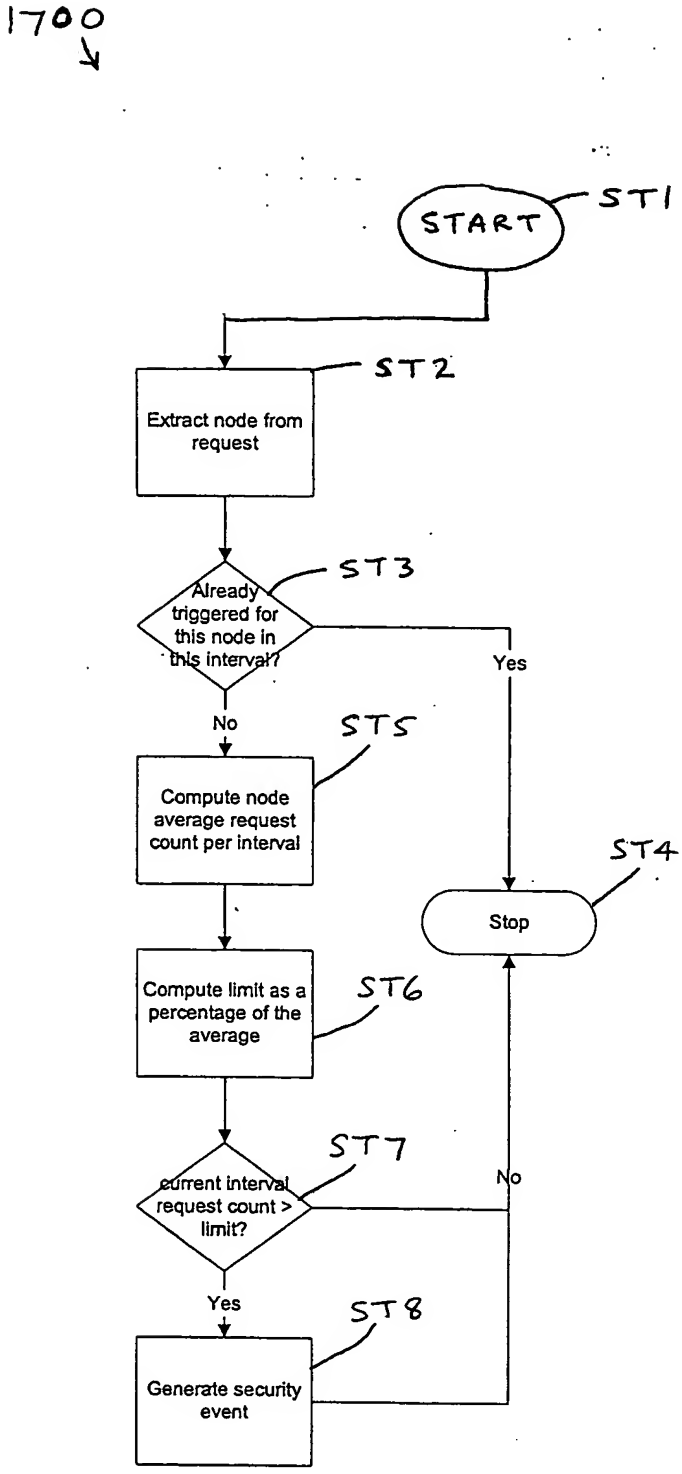
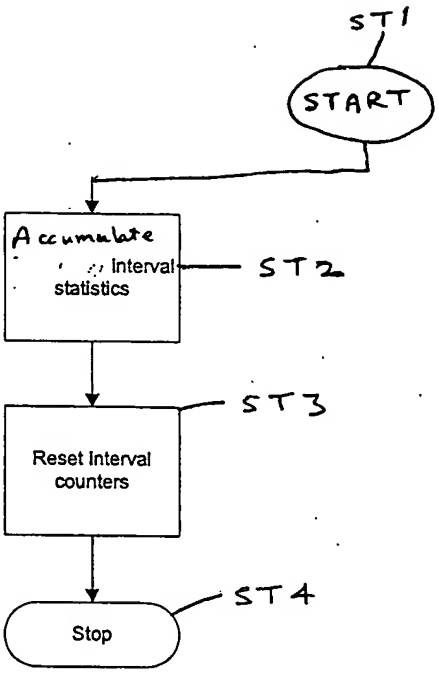


FIG. 17B



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Atty Docket: 1503/9

FIG. 18

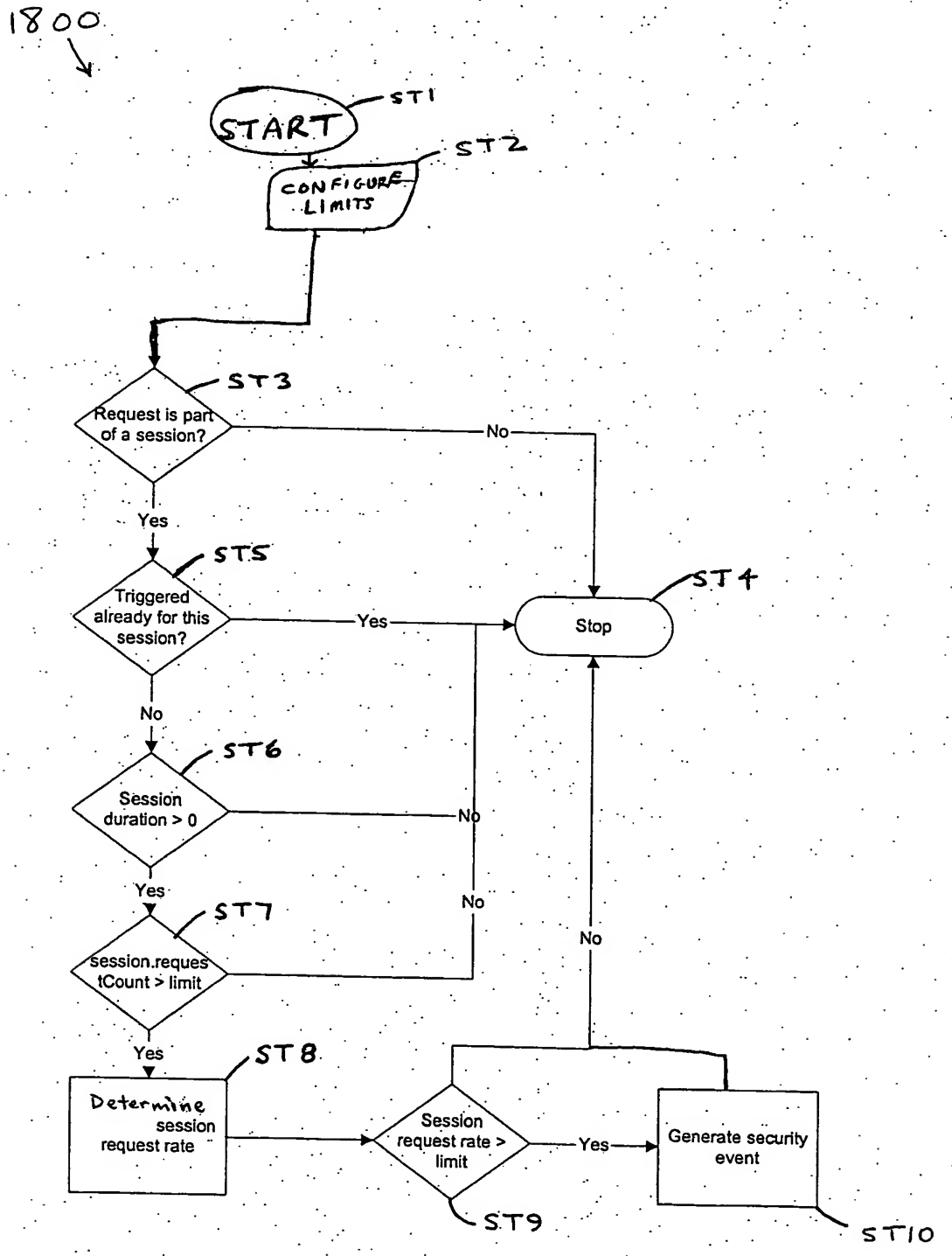

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FIG. 19A

1900

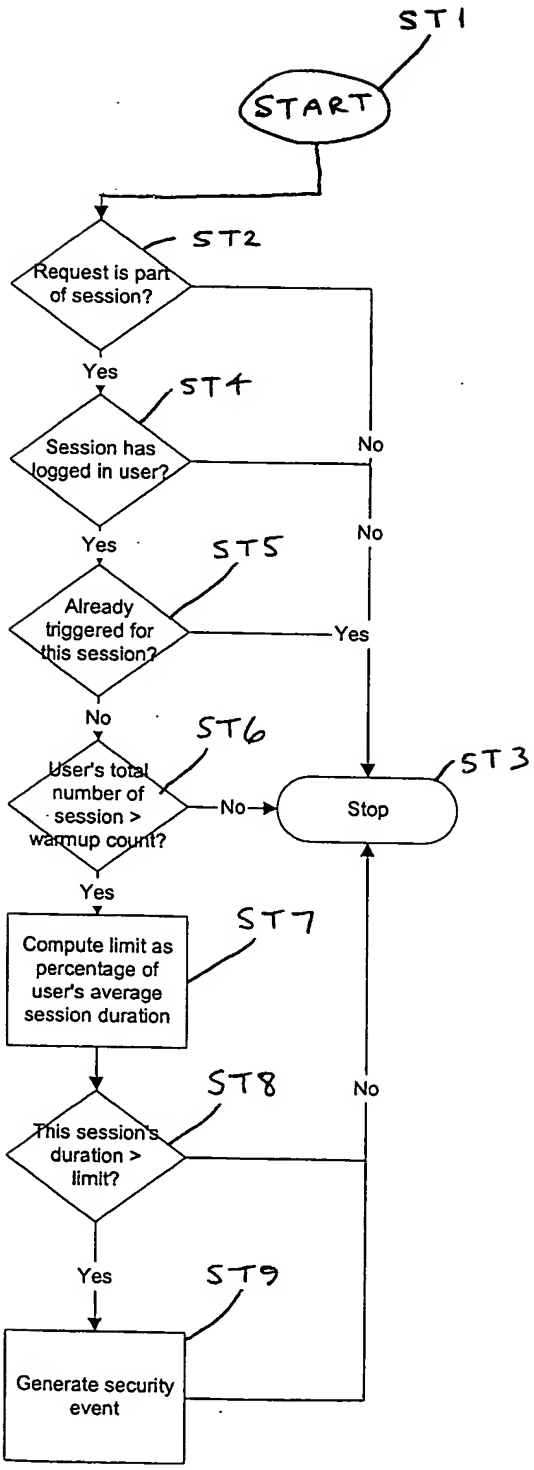
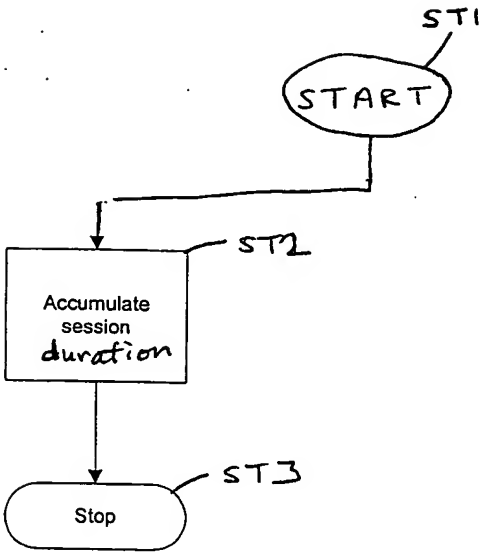


FIG. 19B

1902



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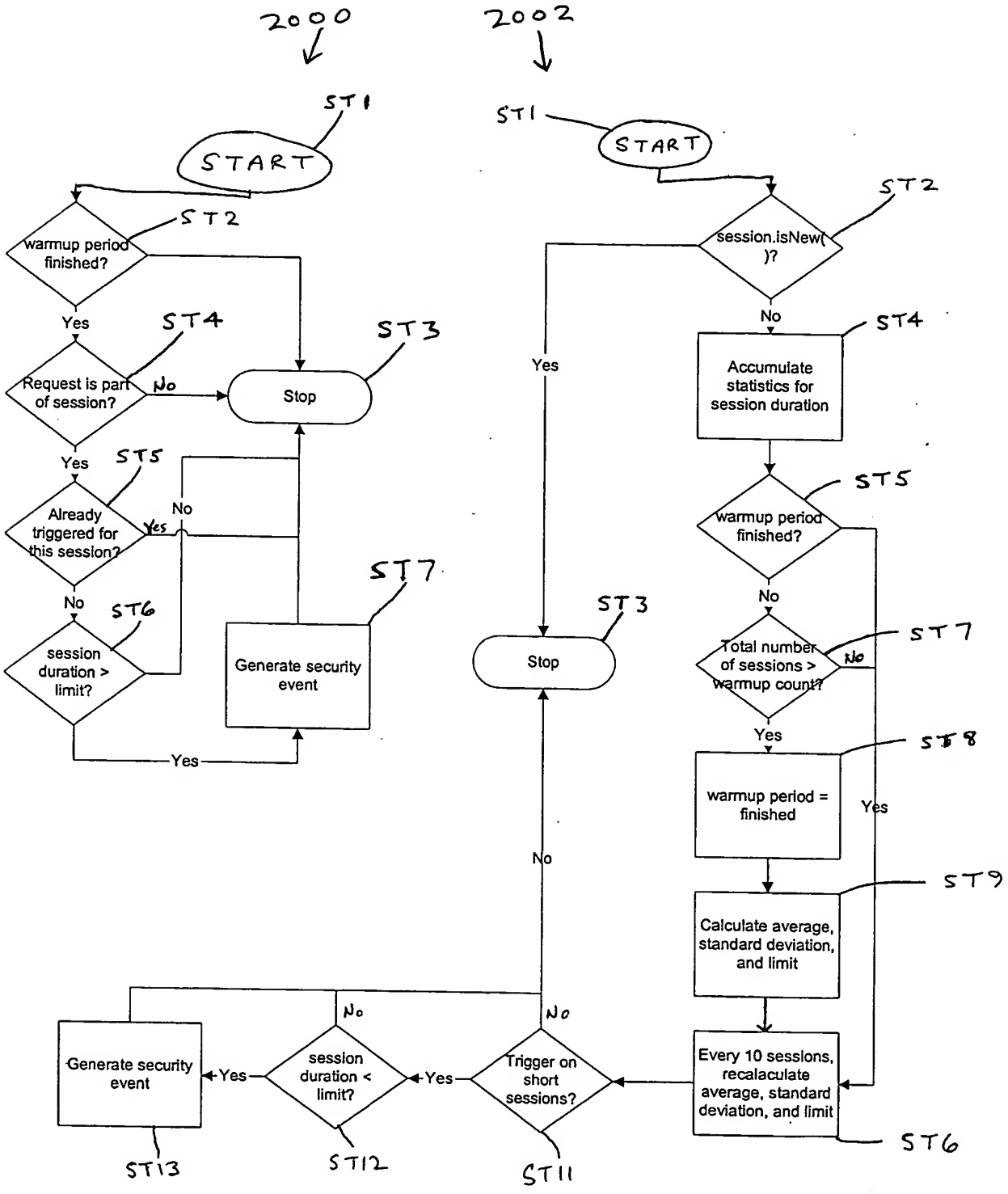
Atty Docket: 1503/9

FIG. 20A

FIG. 20B



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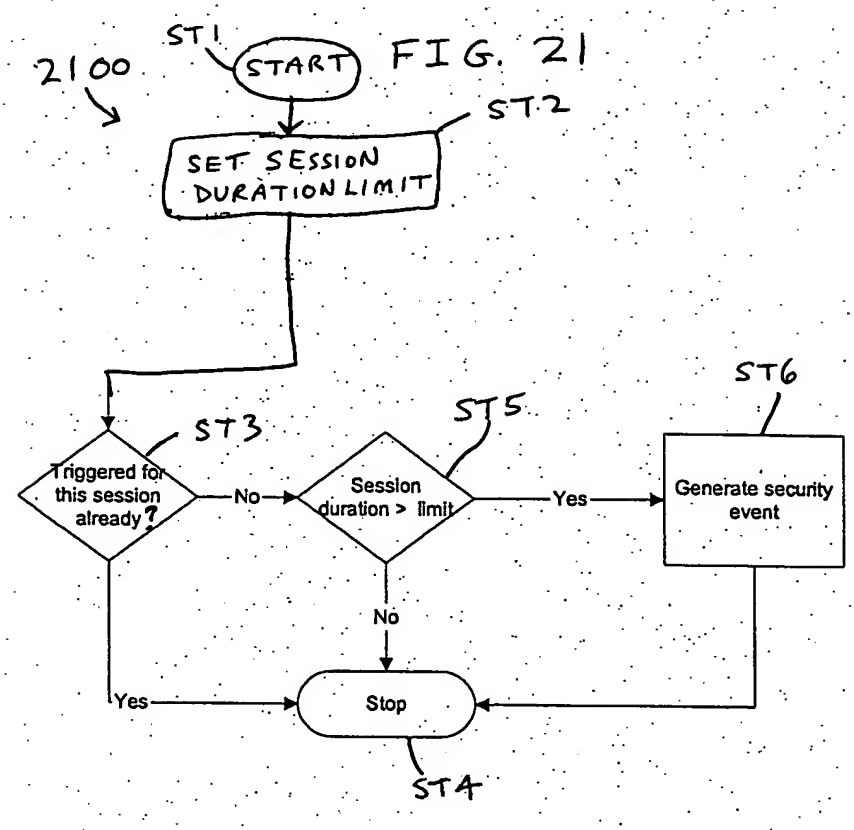

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Atty Docket: 1503/9

FIG. 22A

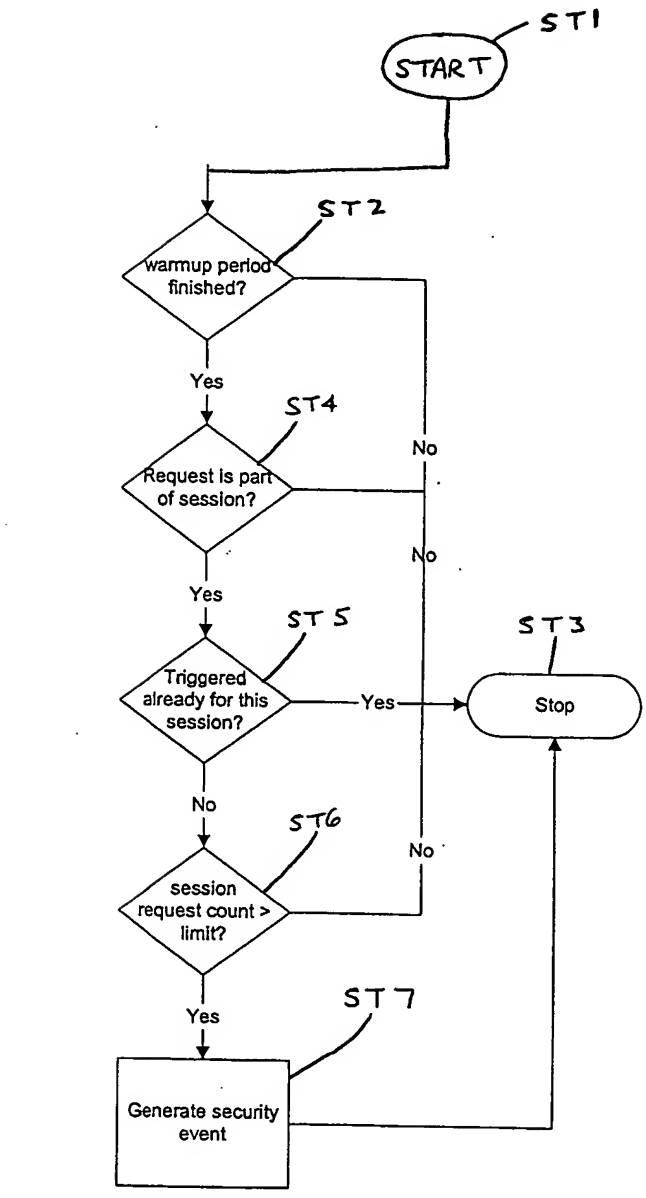
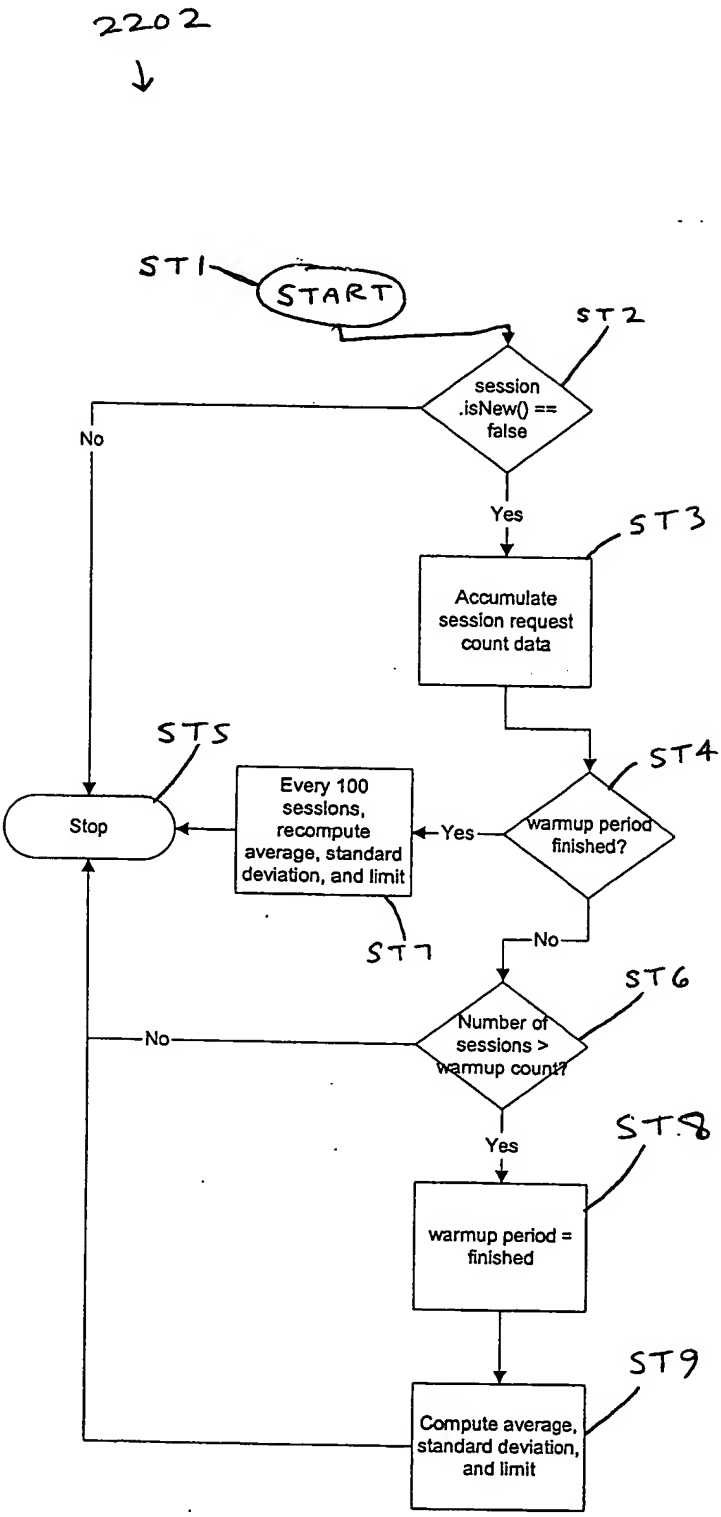


FIG. 22B



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Atty Docket: 1503/9

FIG. 23A

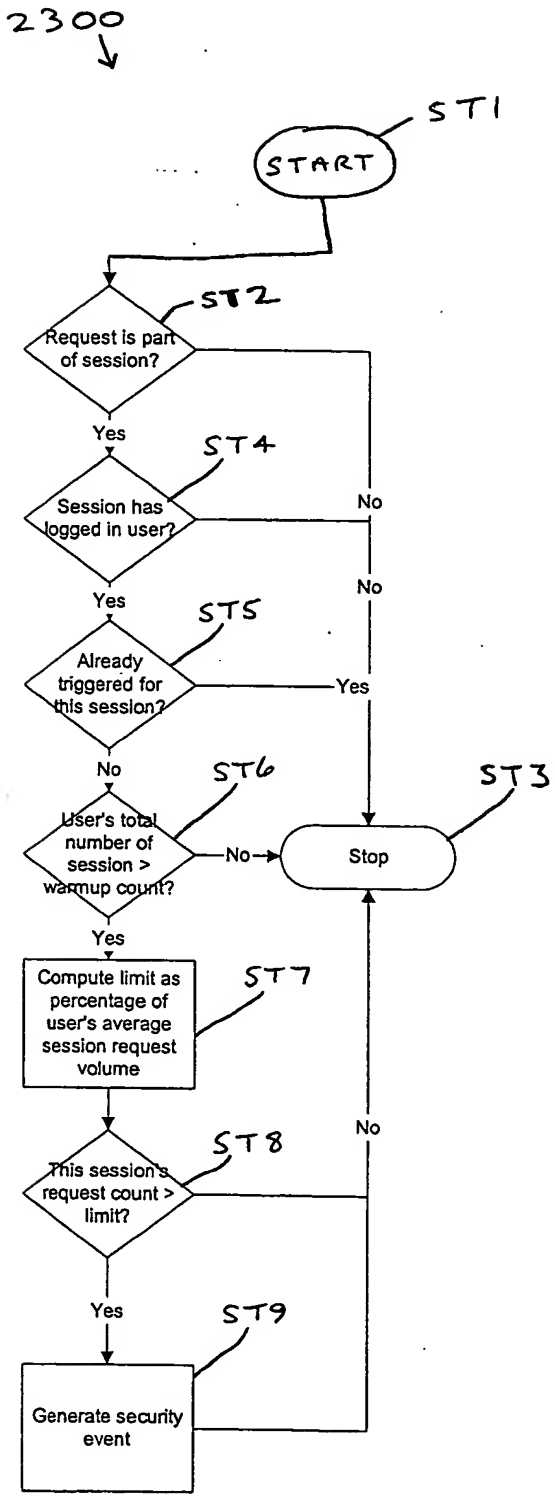
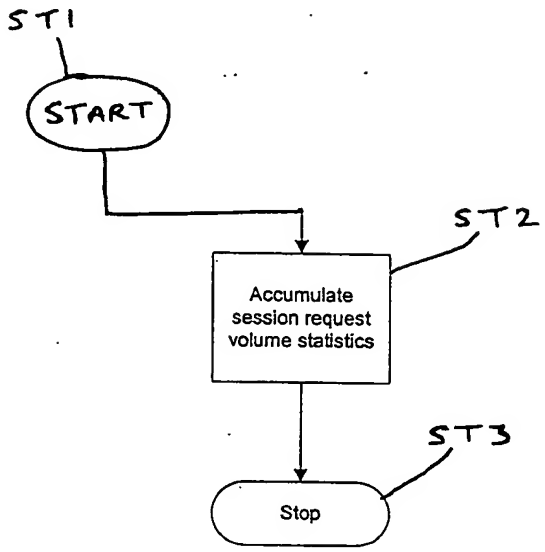


FIG. 23B



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Atty Docket: 1503/9

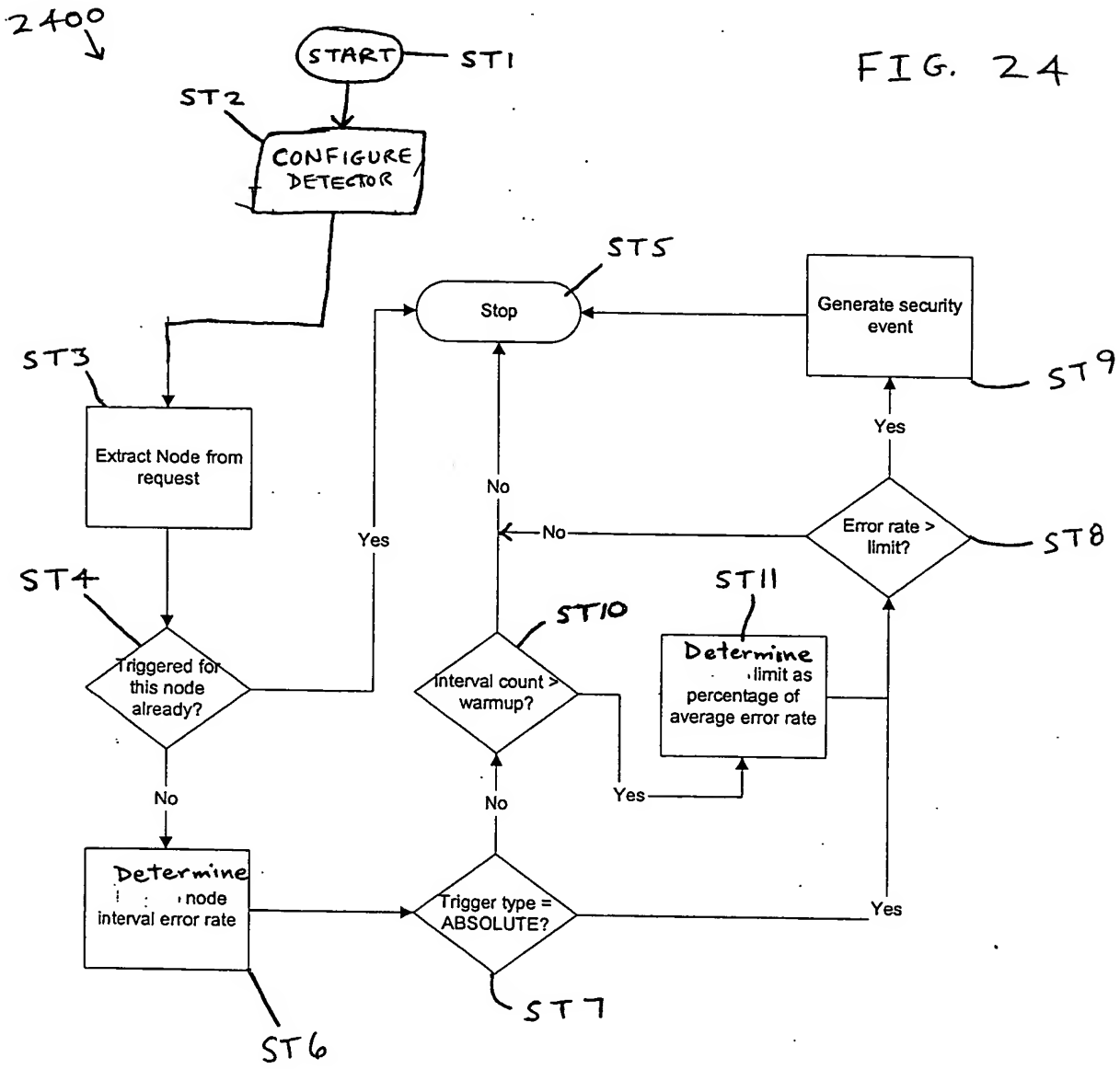
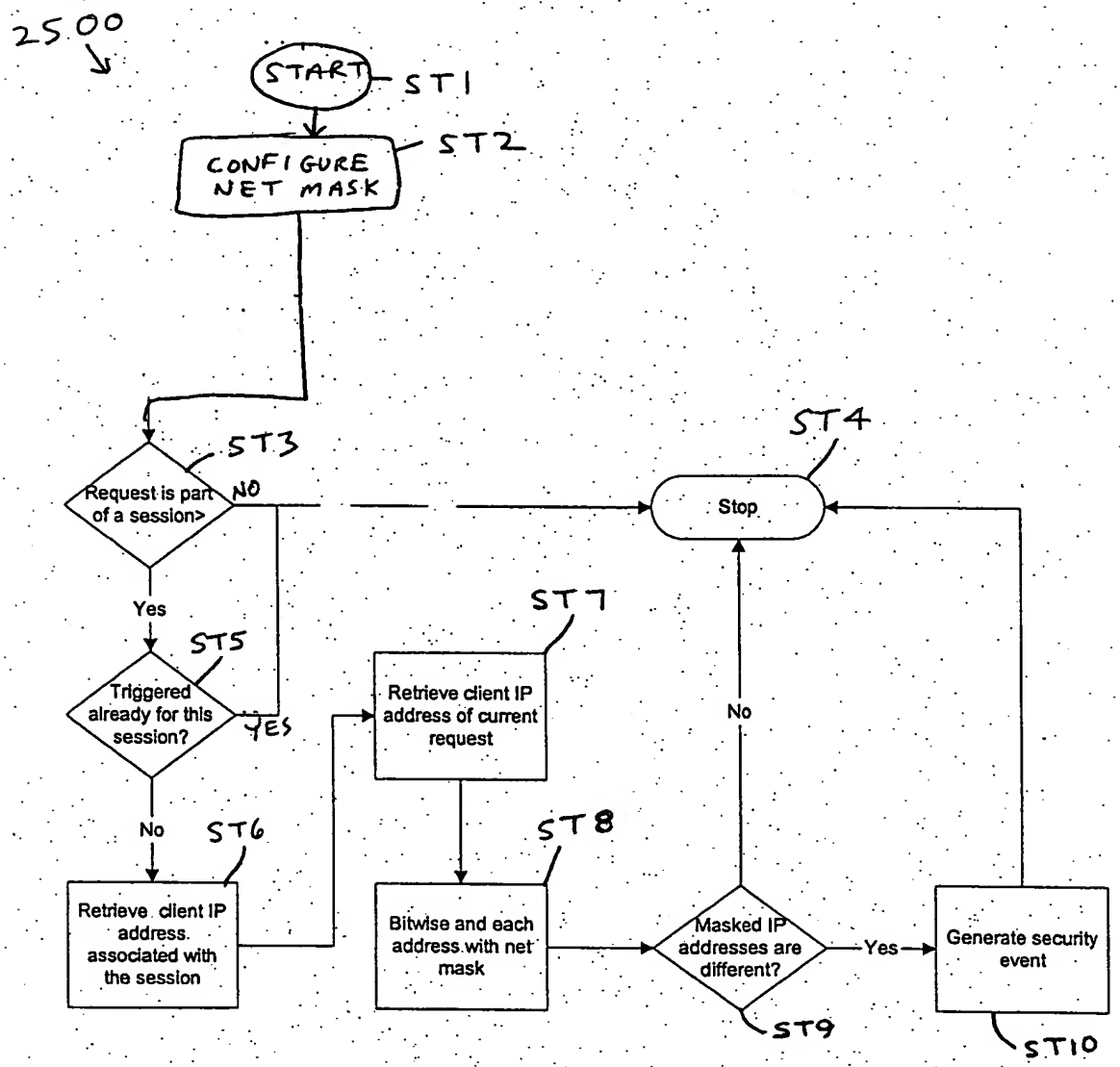


FIG. 24

FIG. 25


2500
START
ST1
CONFIGURE NET MASK
ST2
ST3
Request is part of a session>
NO
Yes
ST4
Stop
ST5
Triggered already for this session?
YES
No
ST6
Retrieve client IP address associated with the session
ST7
Retrieve client IP address of current request
ST8
Bitwise and each address with net mask
Masked IP addresses are different?
ST9
No
Yes
Generate security event
ST10

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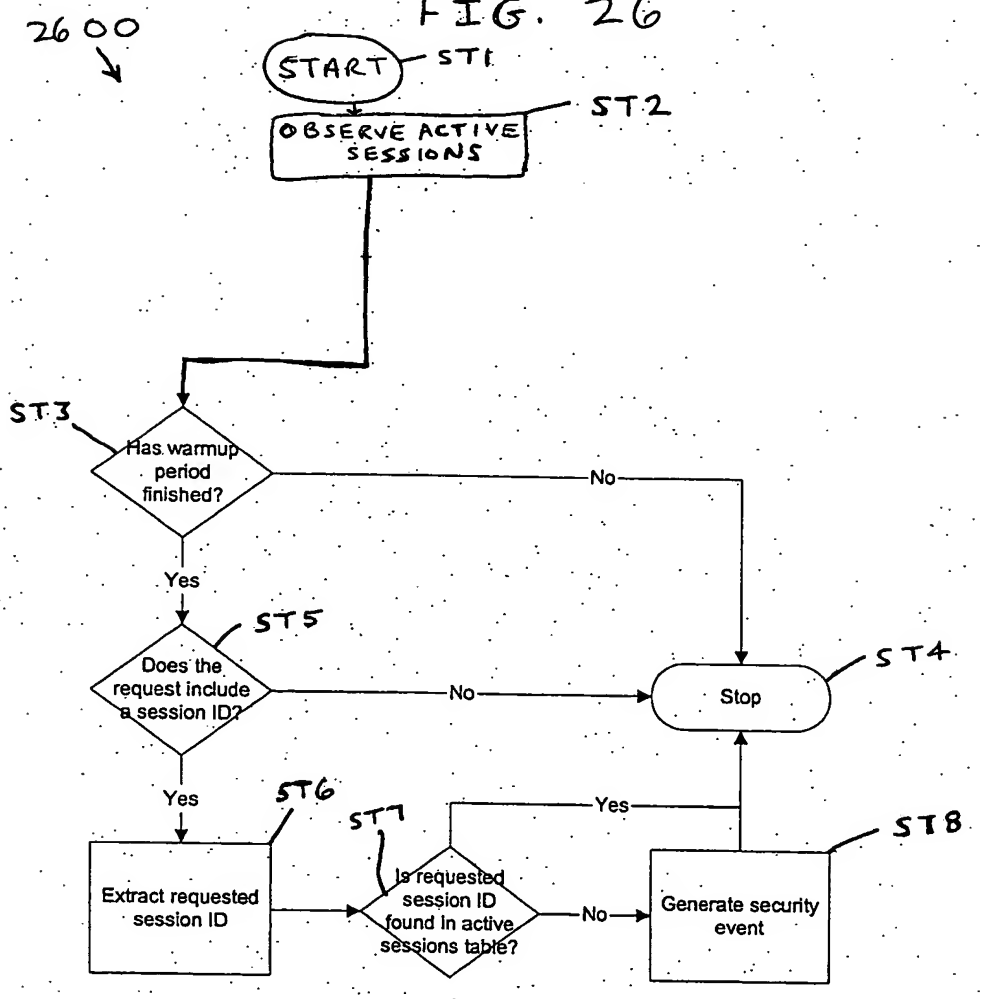
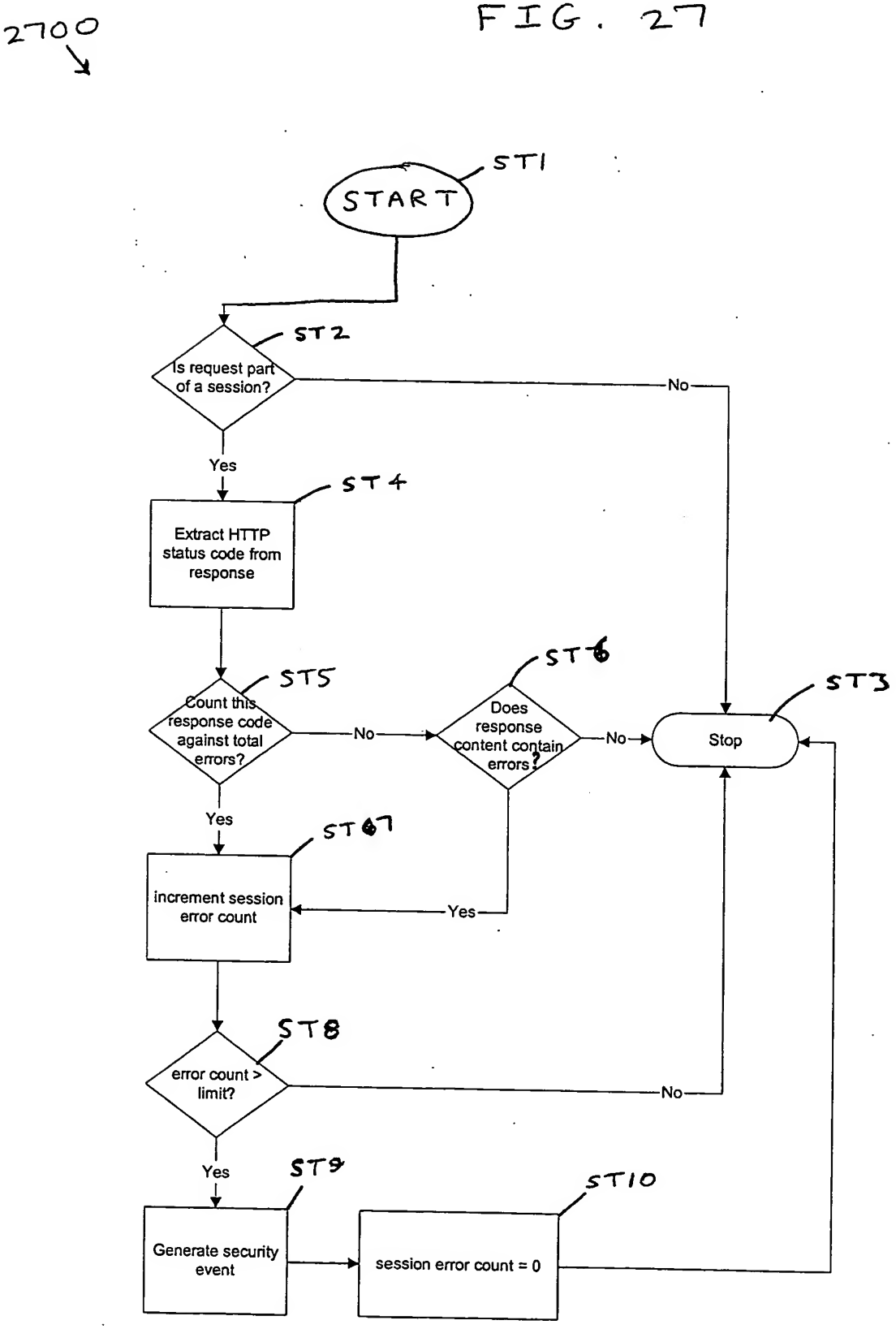
Atty Docket: 1503/9

FIG. 26



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 27



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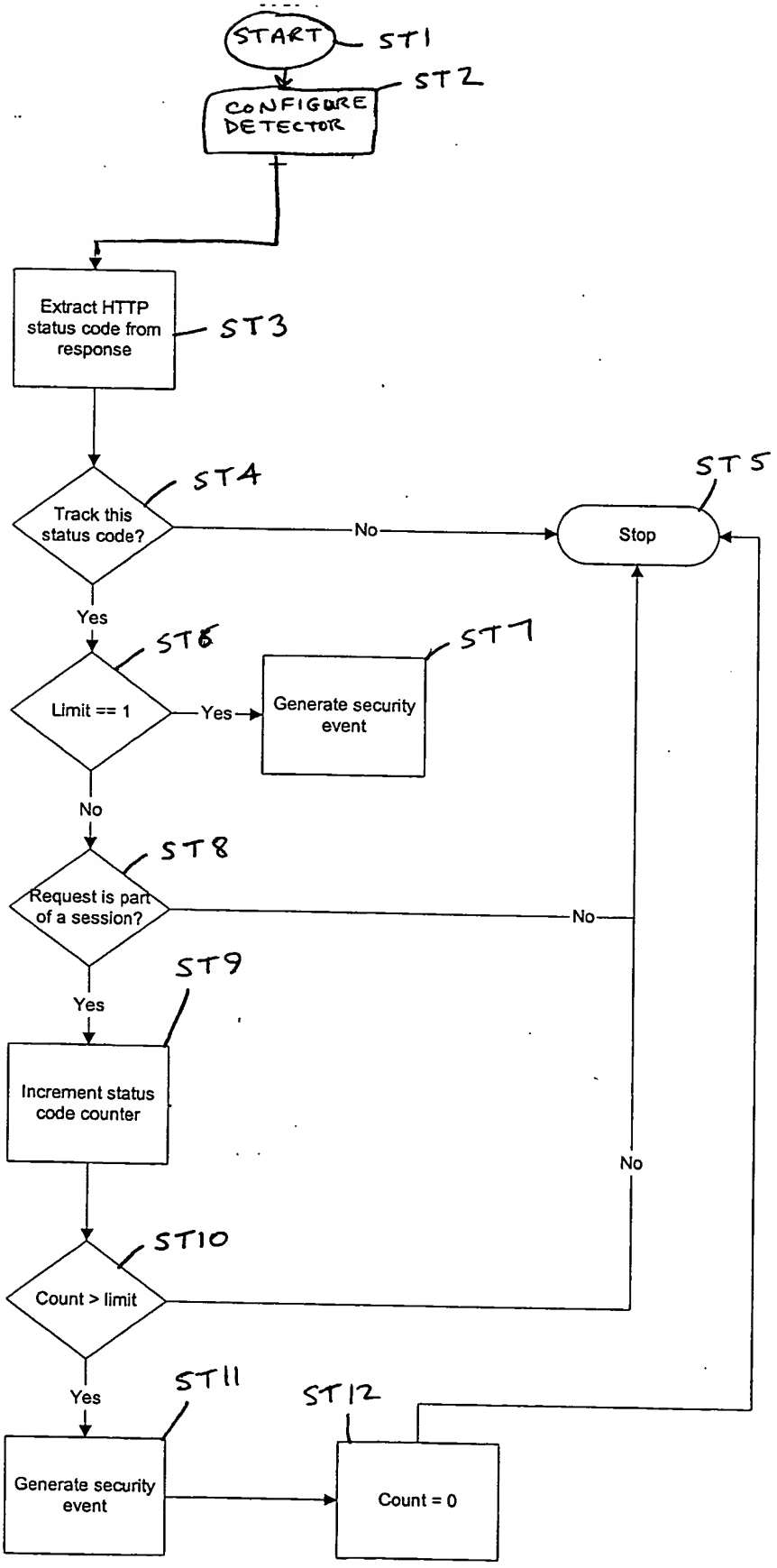
Atty Docket: 1503/9

28-00

FIG. 28



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Atty Docket: 1503/9

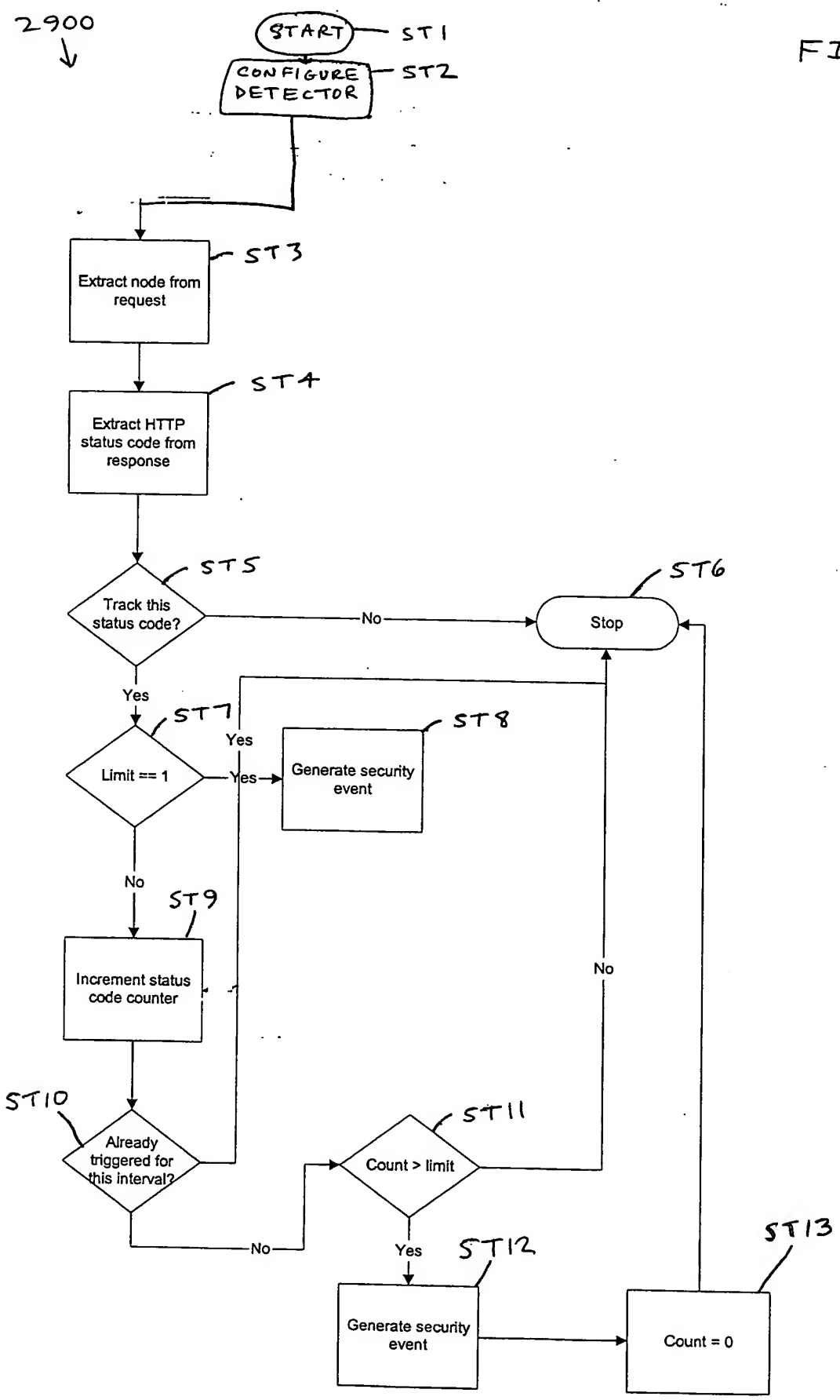
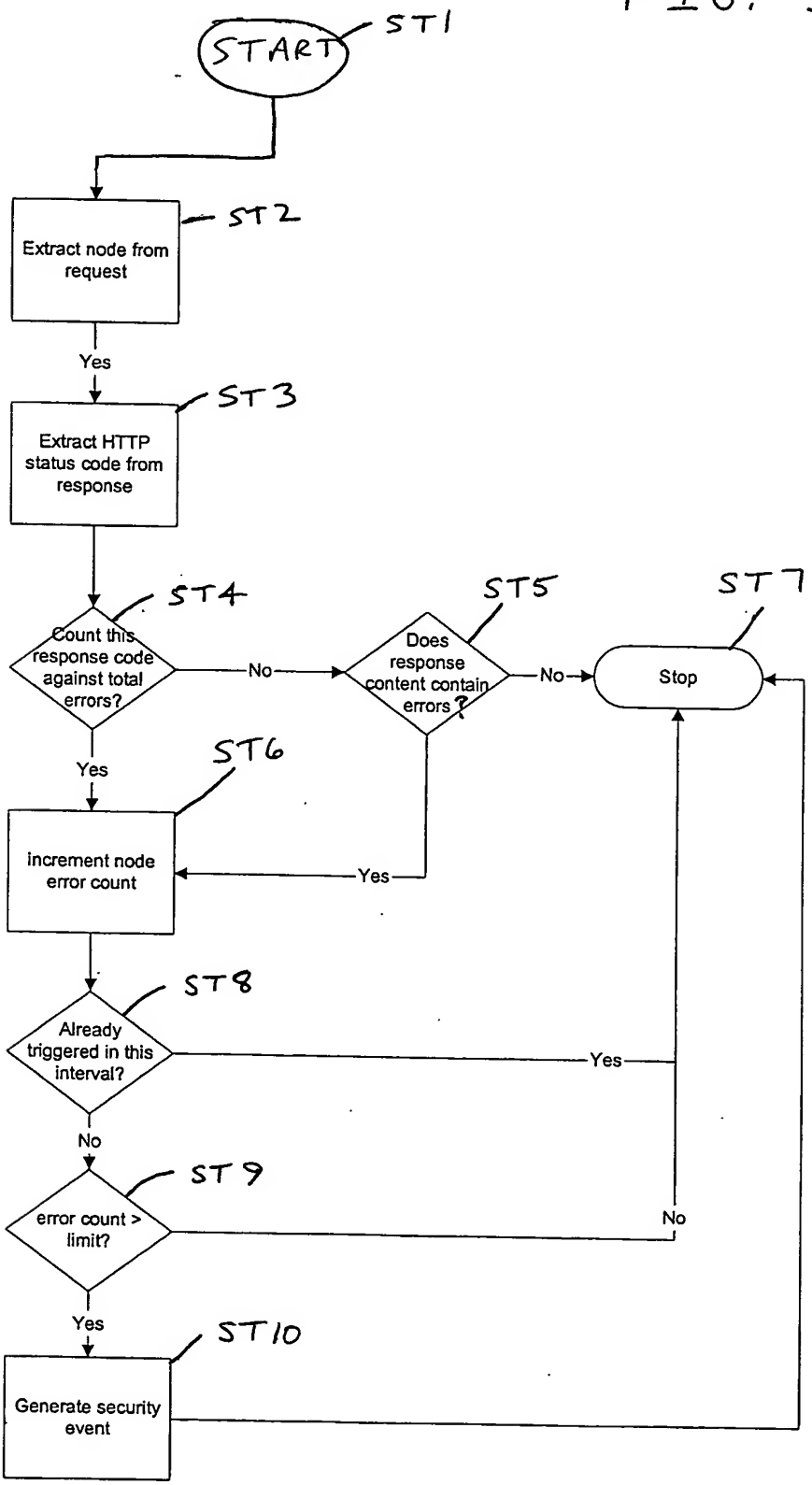


FIG. 29

Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

3000

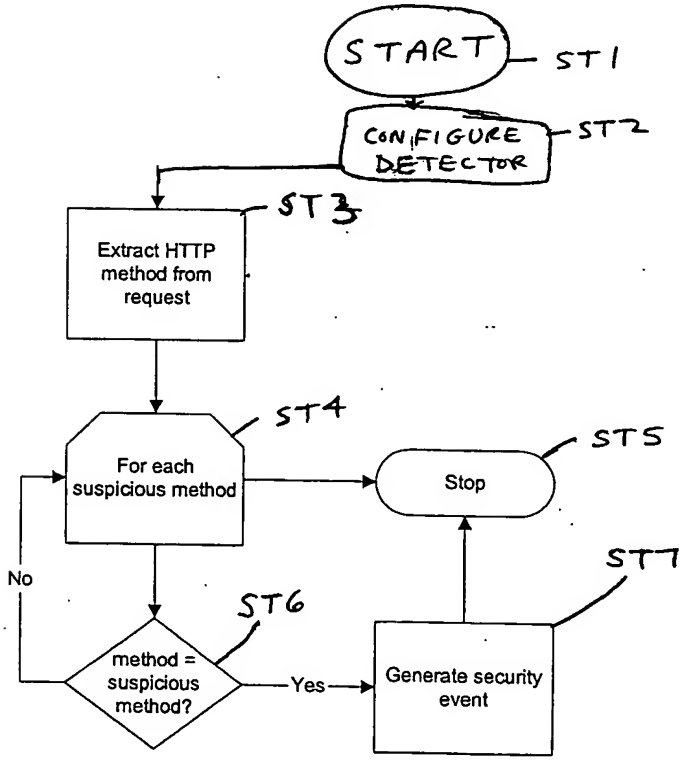
FIG. 30



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

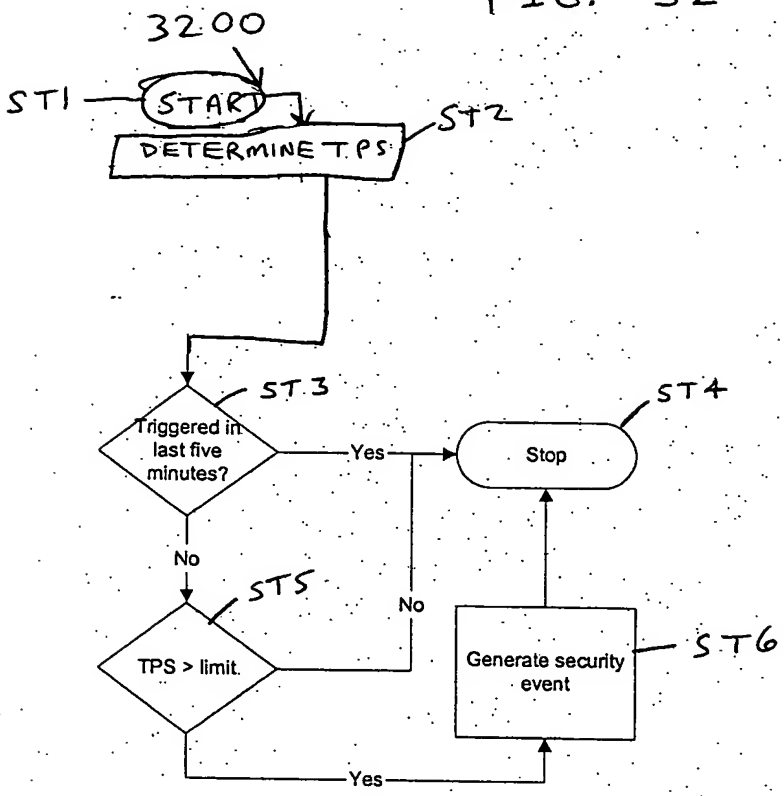
3100

FIG. 31



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 32



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

3300 FIG. 33A.

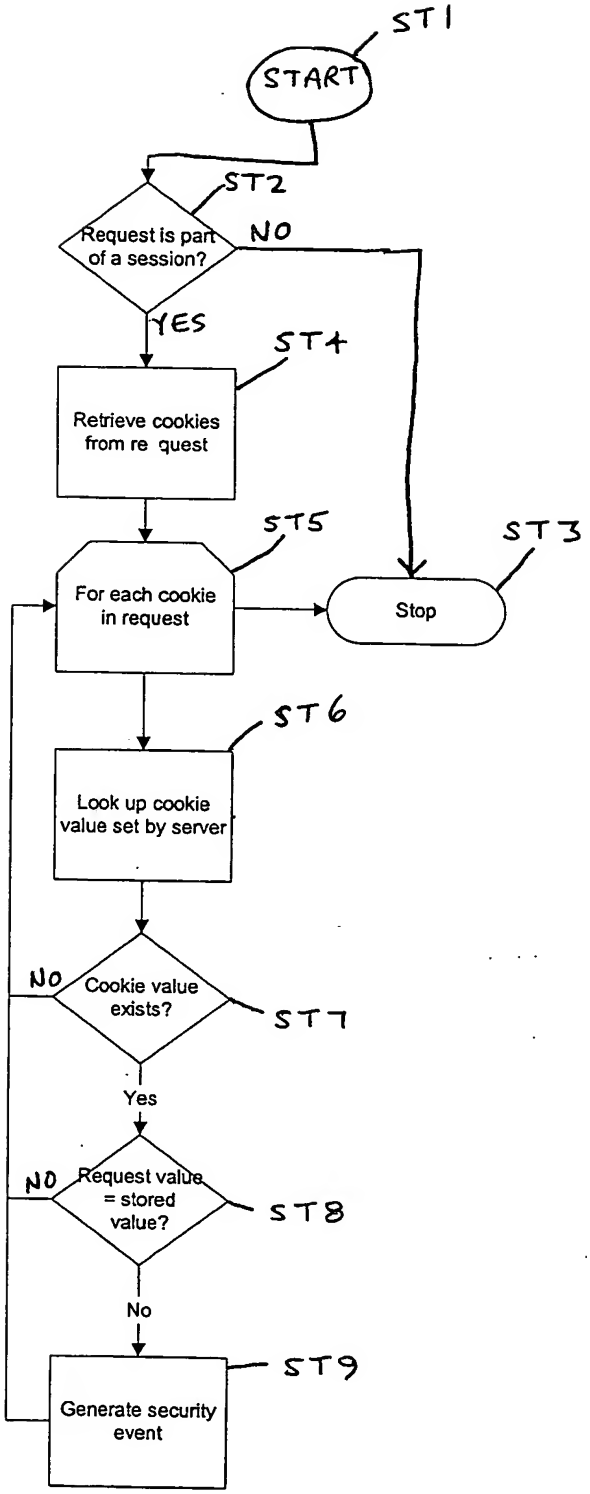
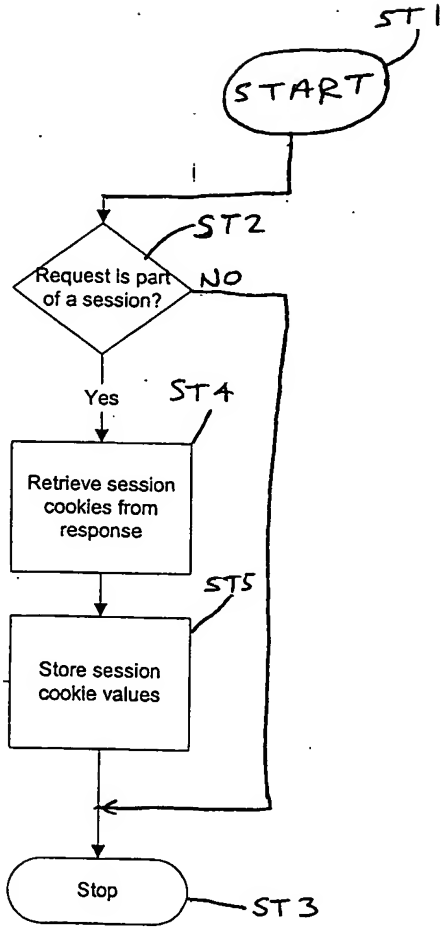


FIG. 33B

3302



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 34A

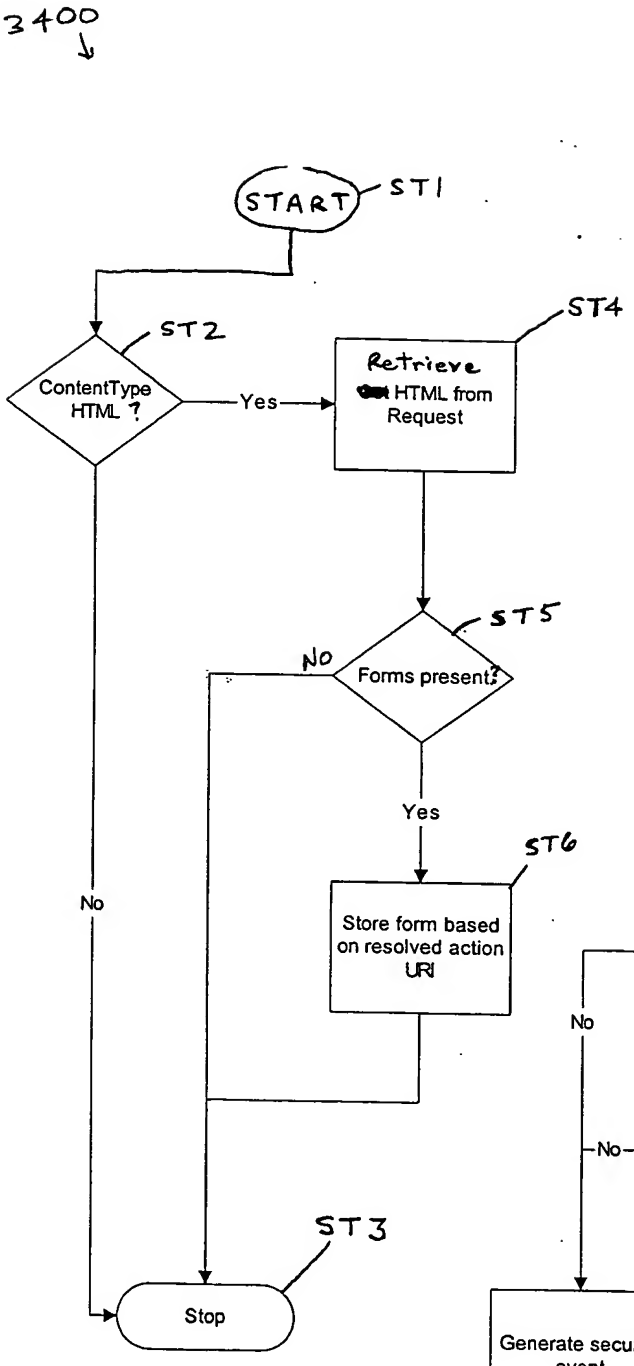
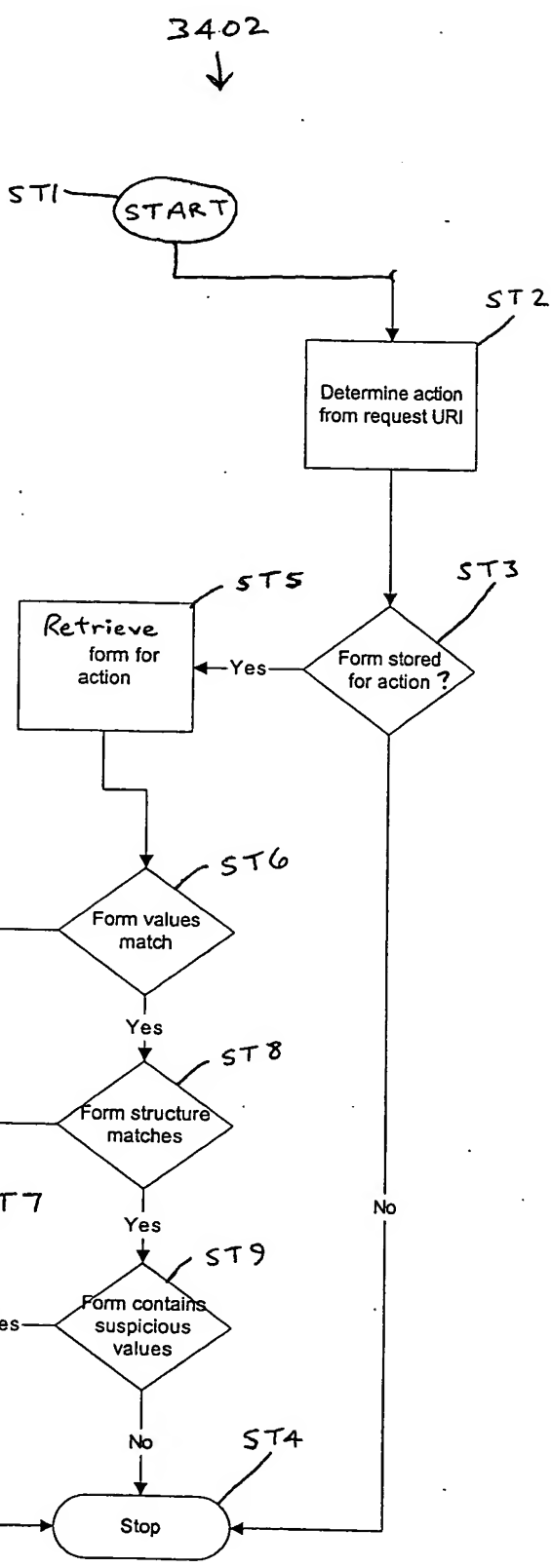
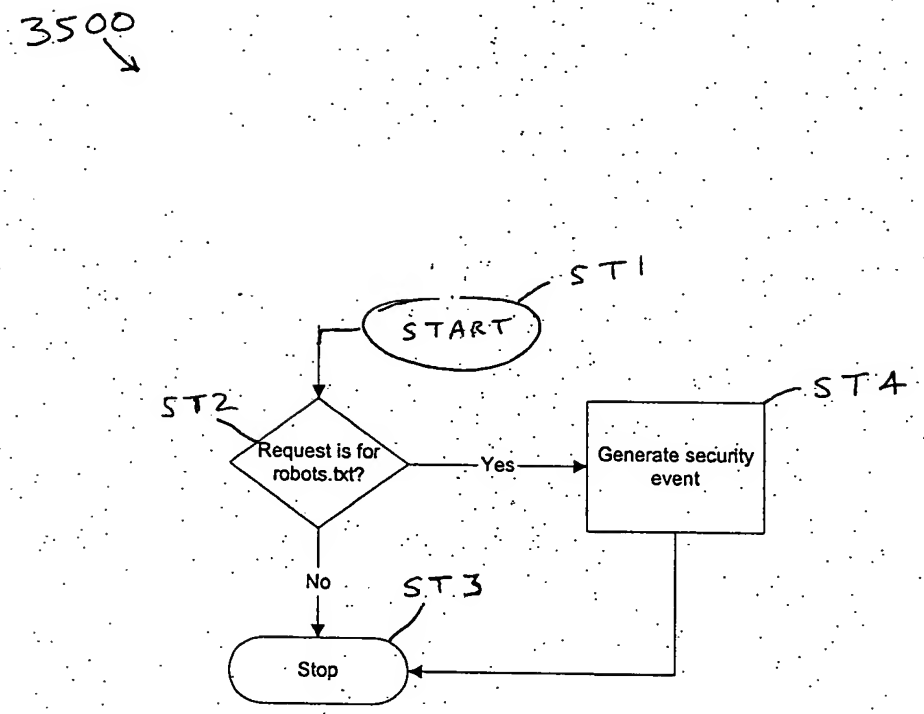


FIG. 34B



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 35



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 36

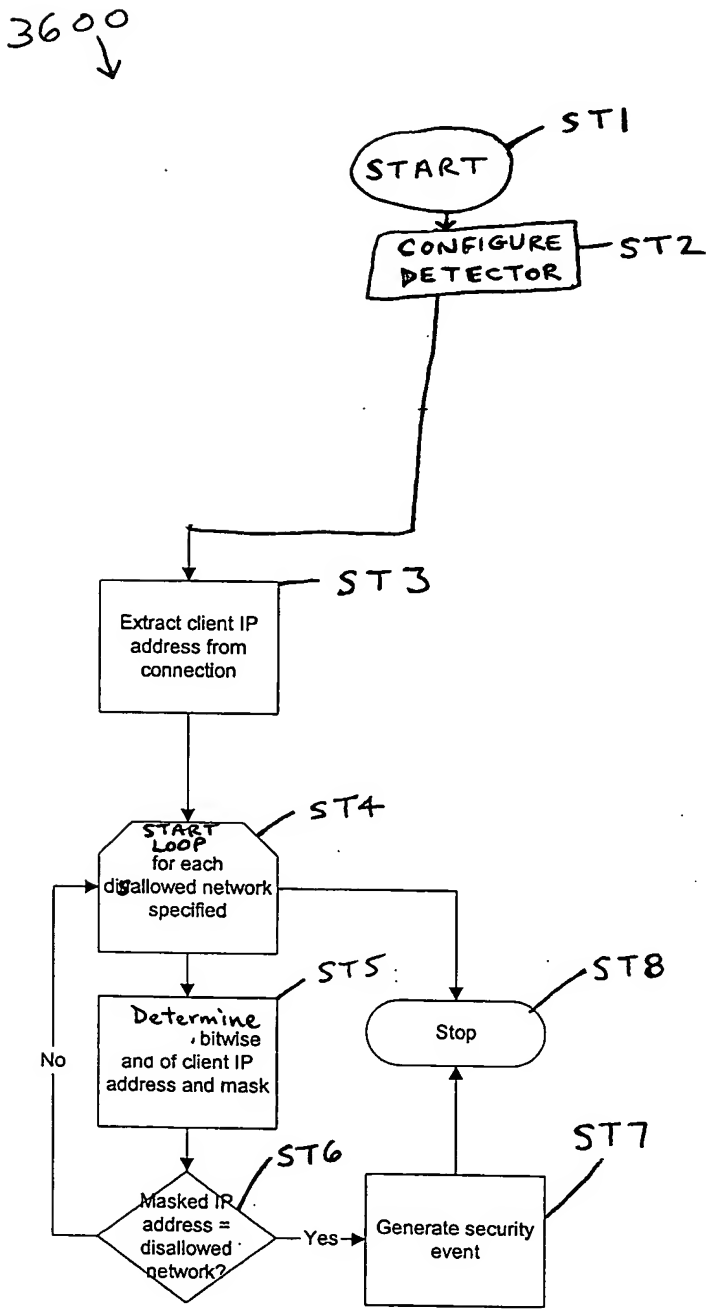
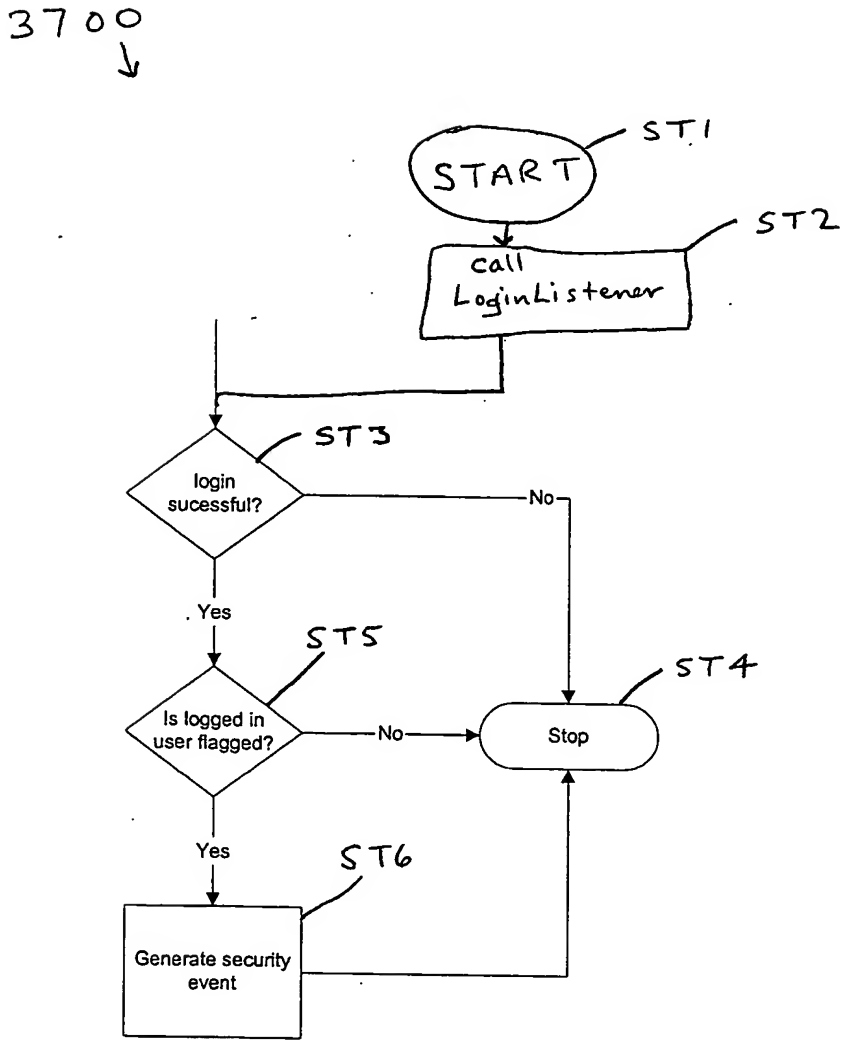
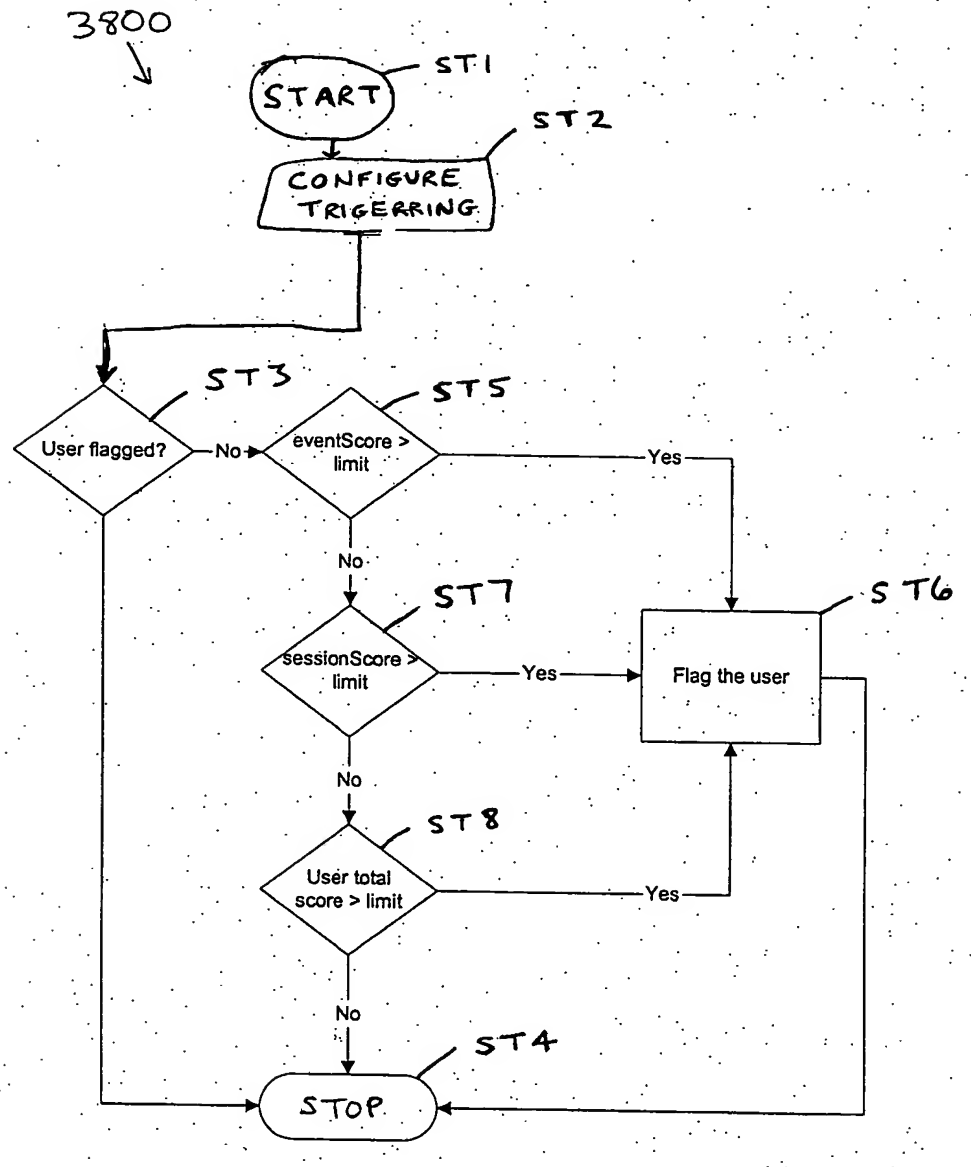


FIG. 37


3700
START
ST1
call LoginListener
ST2
login sucessful?
ST3
No
Yes
Is logged in user flagged?
ST5
No
Stop
ST4
Yes
Generate security event
ST6

Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

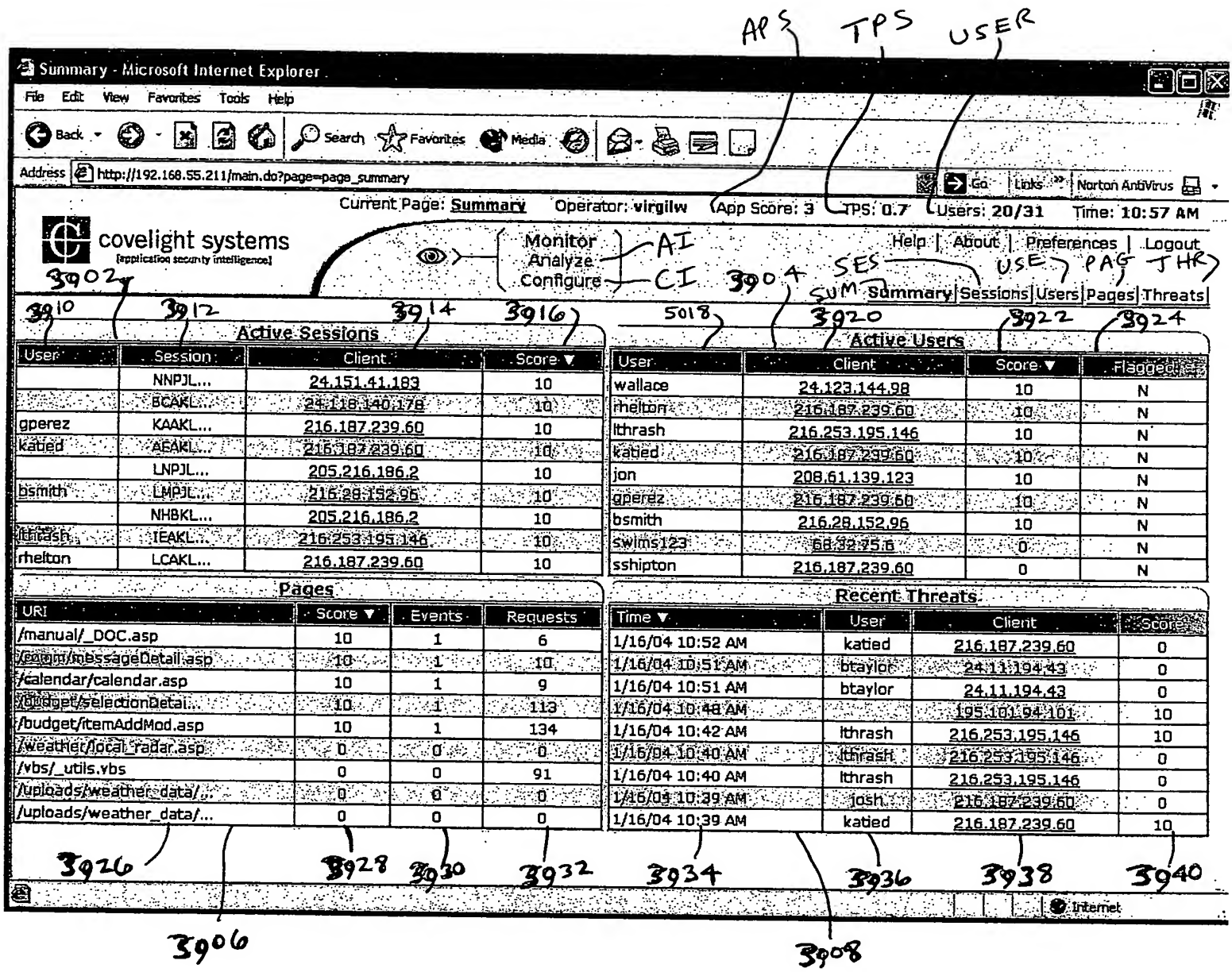
FIG. 38



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION

Atty Docket: 1503/9

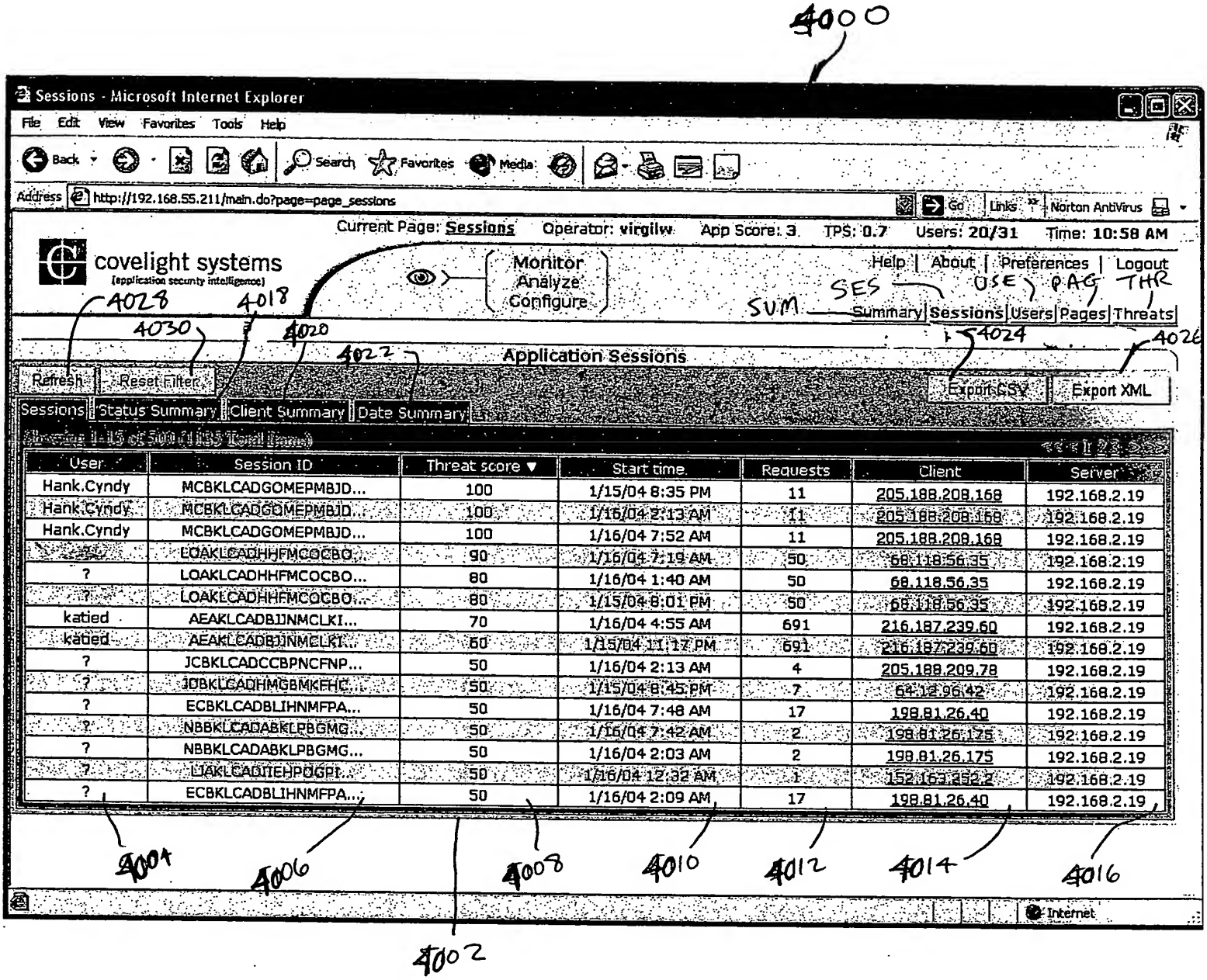
FIG. 39



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION

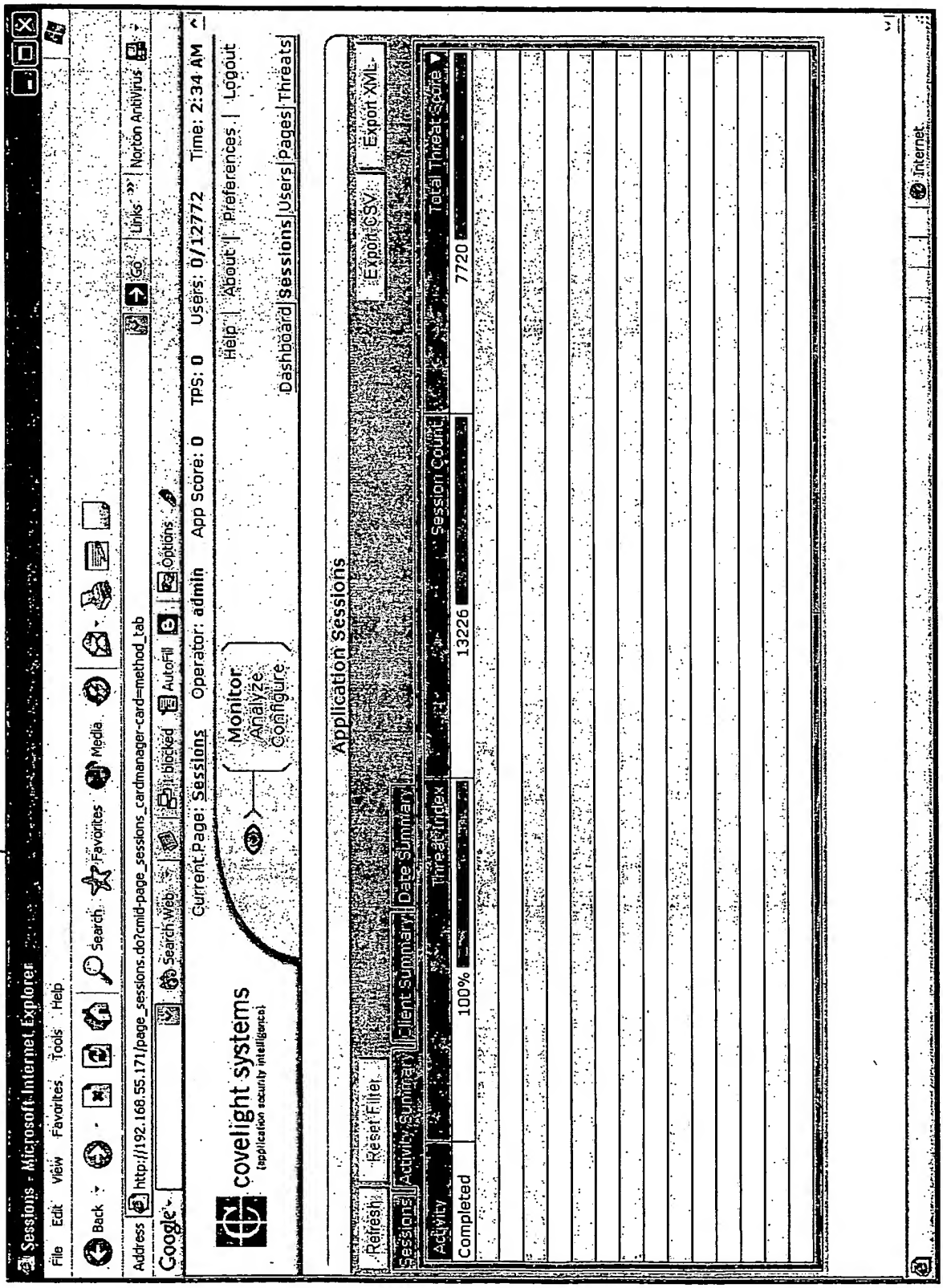
Atty Docket: 1503/9

FIG. 40A



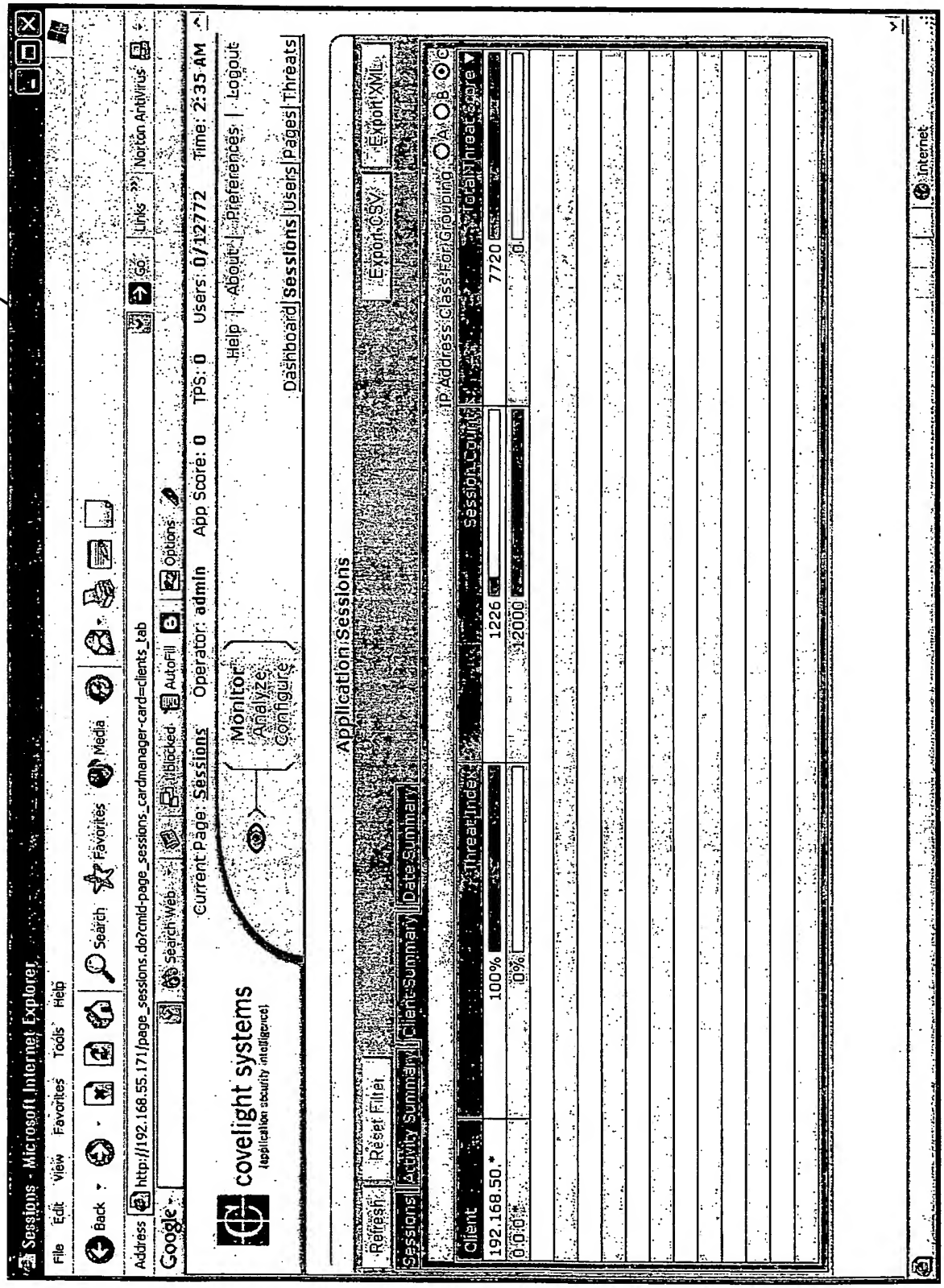
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 40B



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 40C

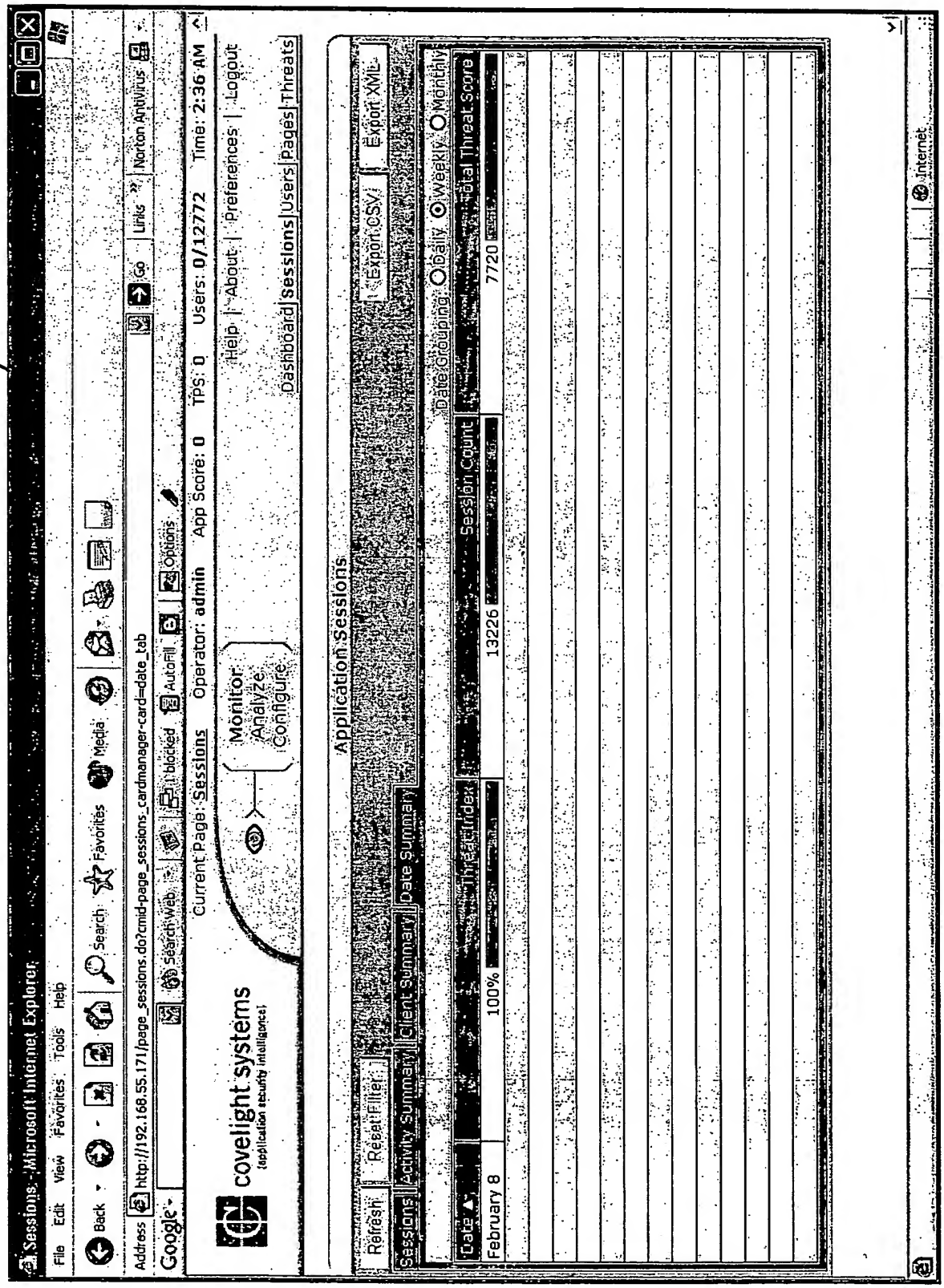


4034

Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION

Atty Docket: 1503/9

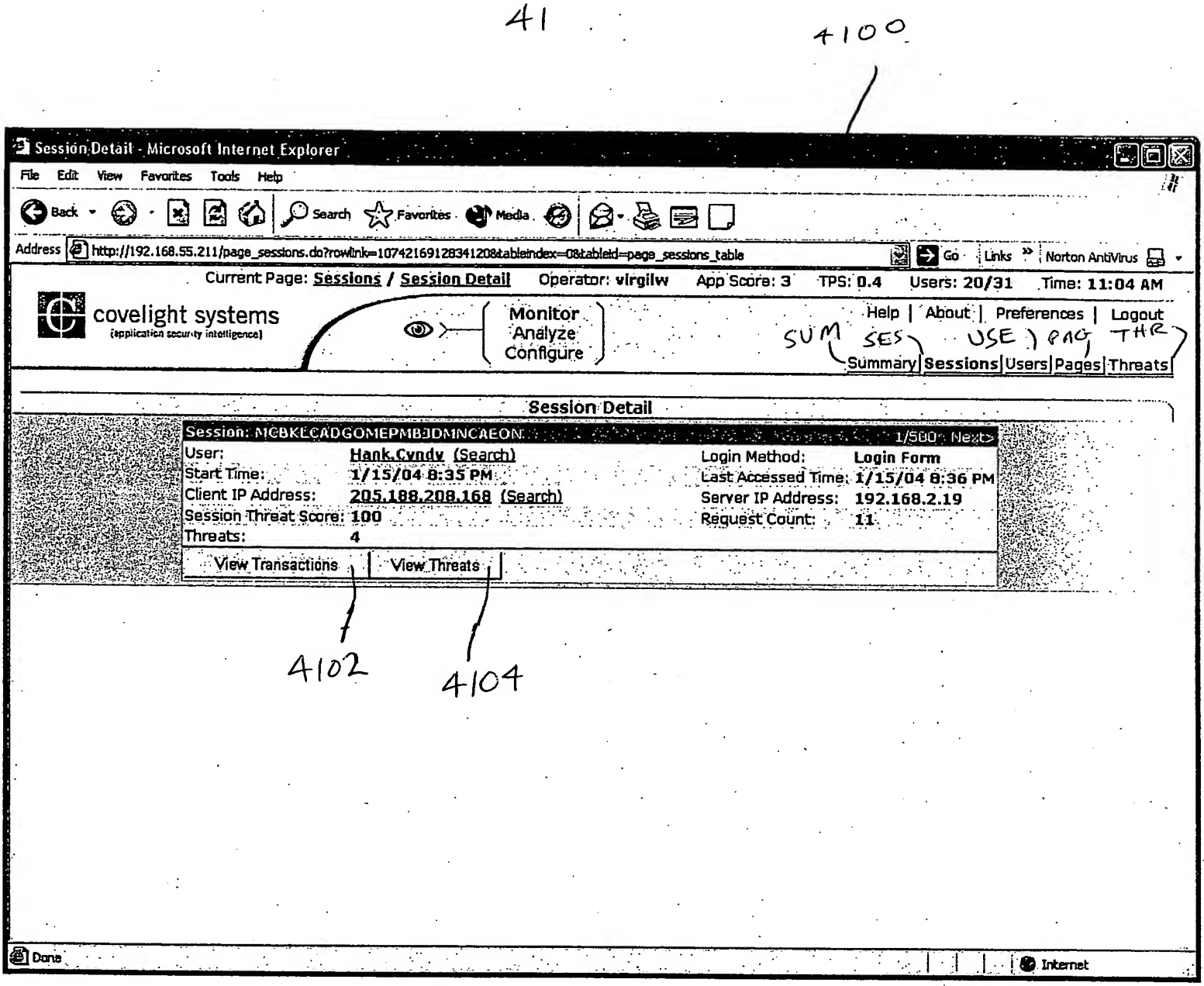
FIG. 40D



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION

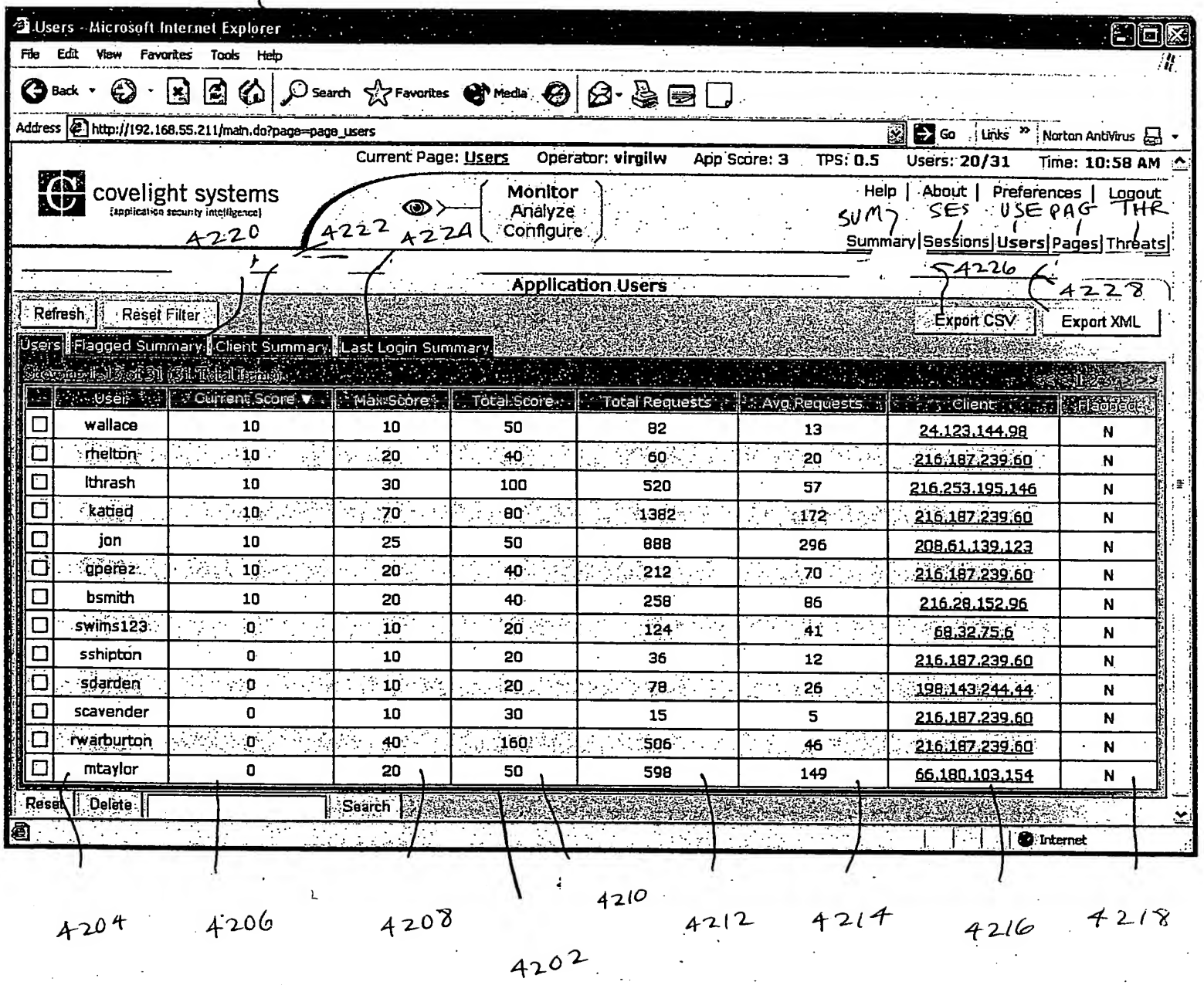
Atty Docket: 1503/9

FIG. 41



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

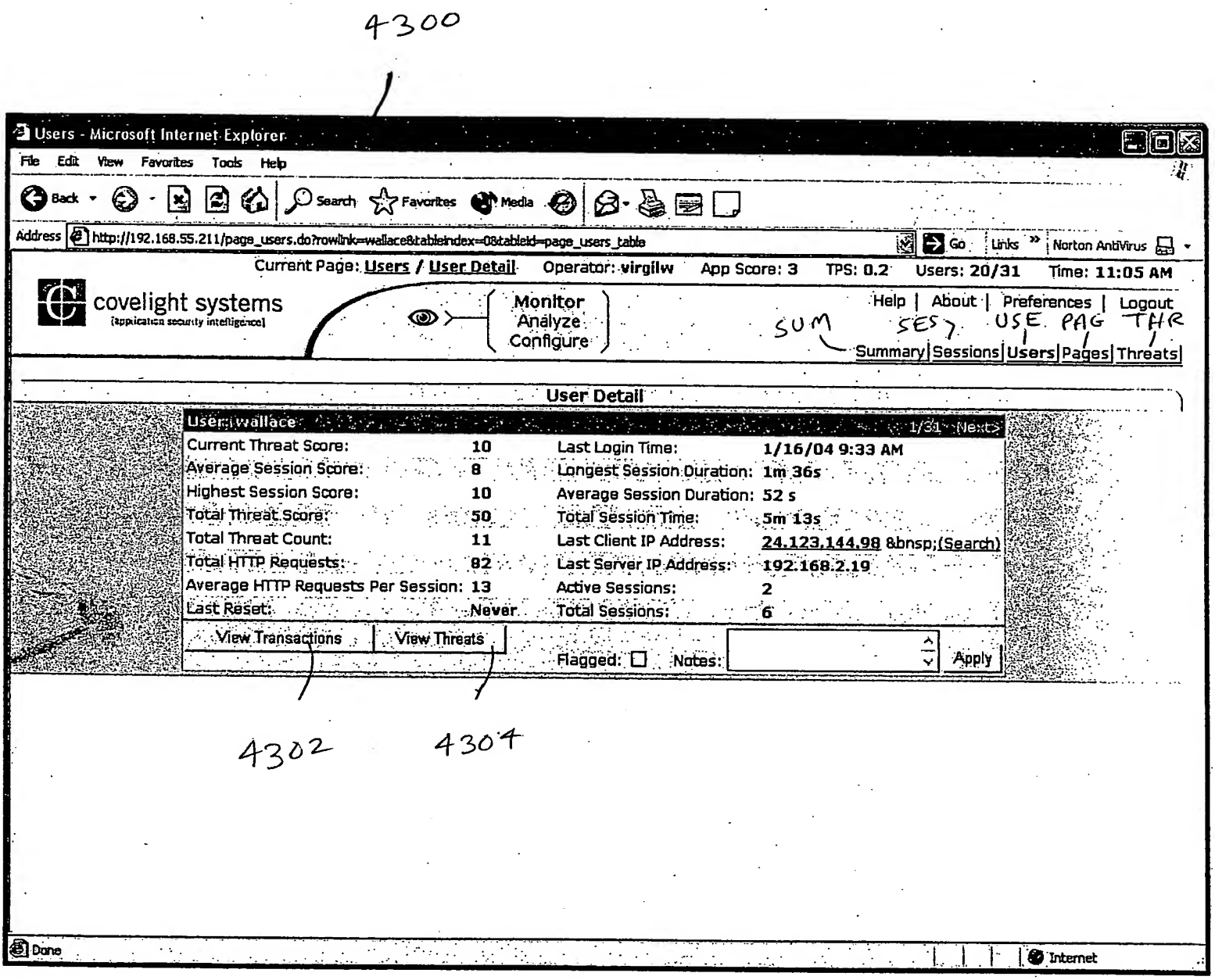
FIG. 42



User	Current Score	Max Score	Total Score	Total Requests	Avg Requests	Client	Flagged
wallace	10	10	50	82	13	24.123.144.98	N
rhelton	10	20	40	60	20	216.187.239.60	N
lthrash	10	30	100	520	57	216.253.195.146	N
katied	10	70	80	1382	172	216.187.239.60	N
jon	10	25	50	888	296	208.61.139.123	N
gperez	10	20	40	212	70	216.187.239.60	N
bsmith	10	20	40	258	86	216.28.152.96	N
swims123	0	10	20	124	41	68.32.75.6	N
sshipton	0	10	20	36	12	216.187.239.60	N
sdarden	0	10	20	78	26	198.143.244.44	N
scavender	0	10	30	15	5	216.187.239.60	N
rwarburton	0	40	160	506	46	216.187.239.60	N
mtaylor	0	20	50	598	149	66.180.103.154	N

Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

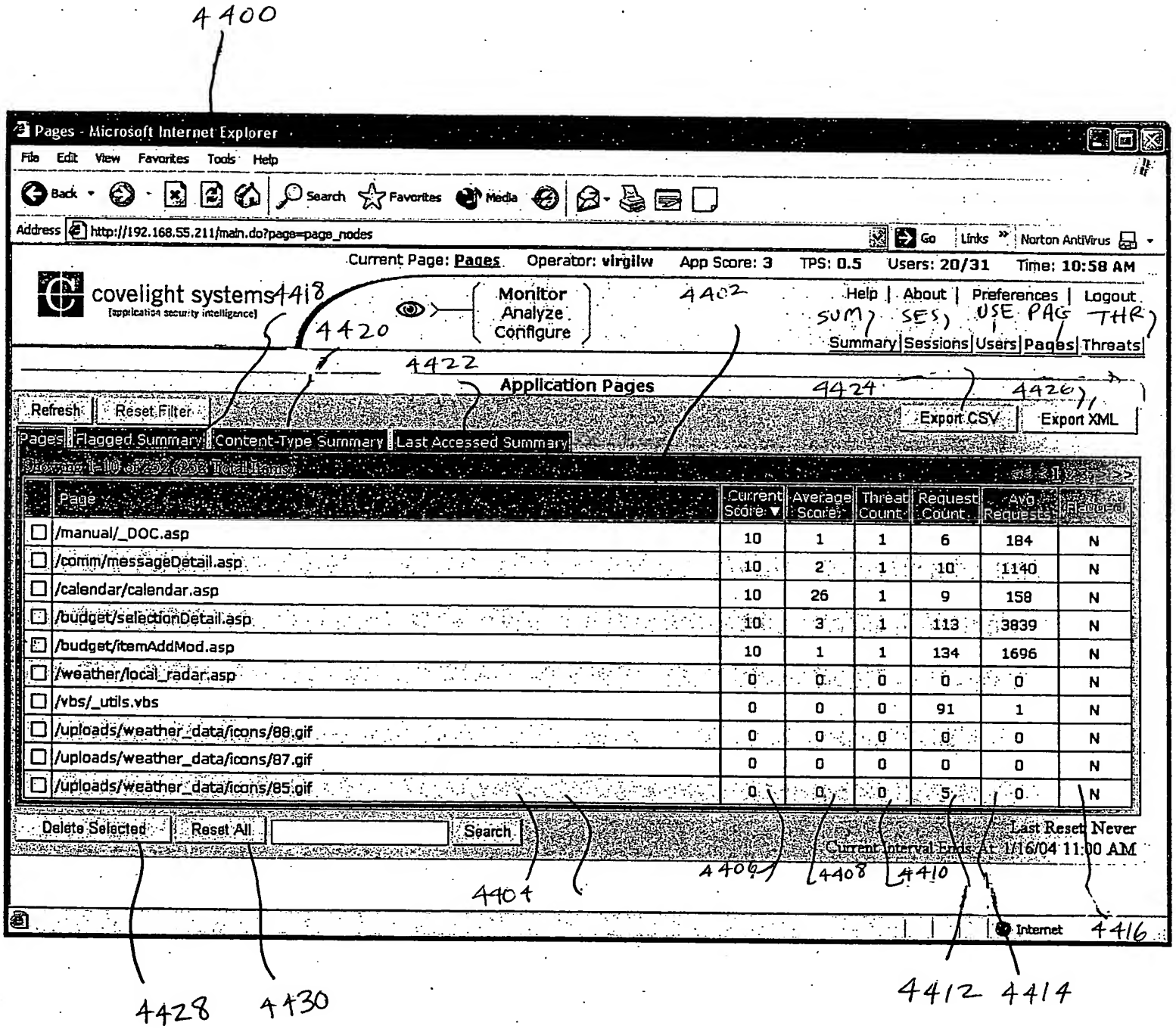
FIG. 43



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION

Atty Docket: 1503/9

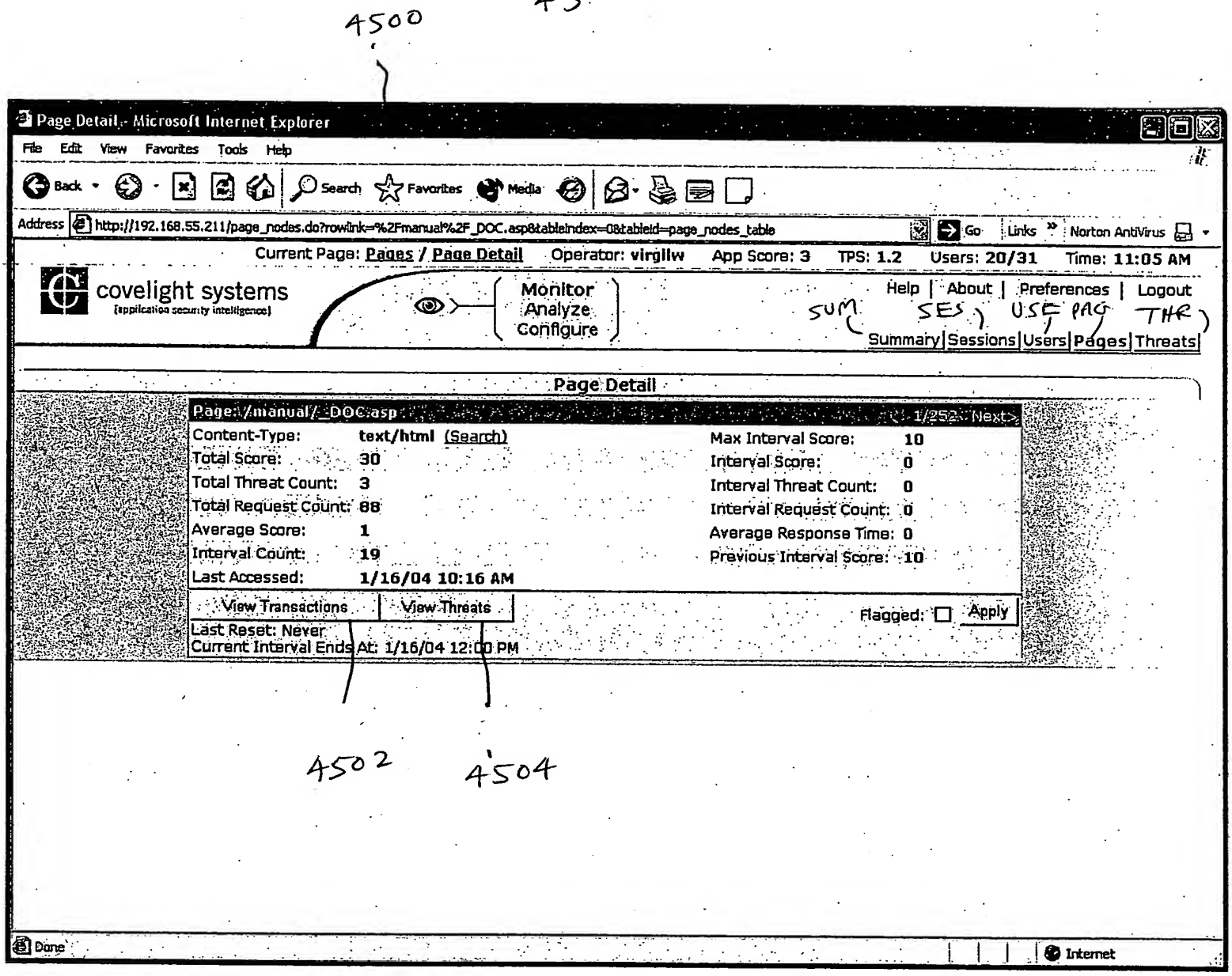
FIG. 44



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION

Atty Docket: 1503/9

FIG. 45



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION

Atty Docket: 1503/9

FIG. 46A

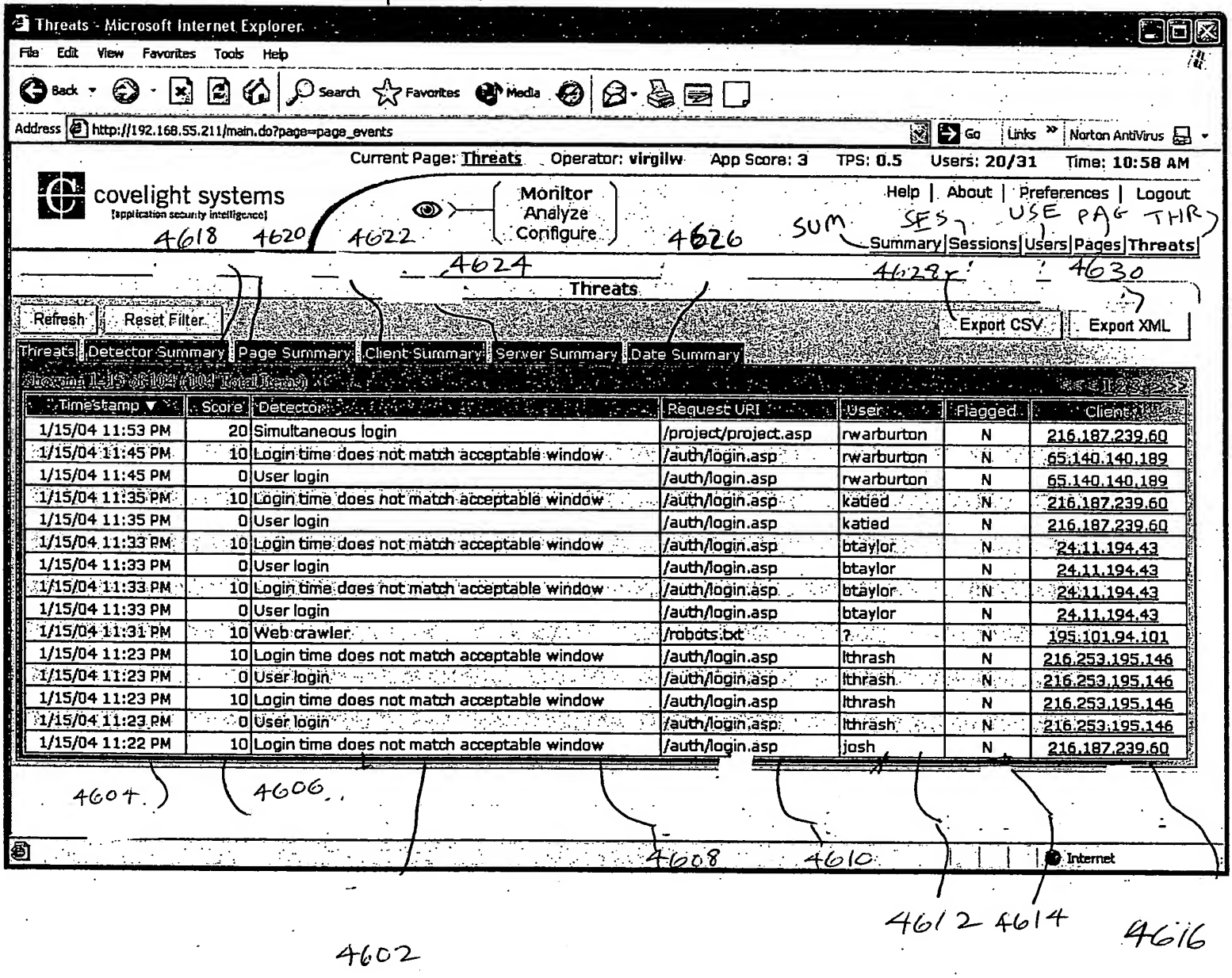
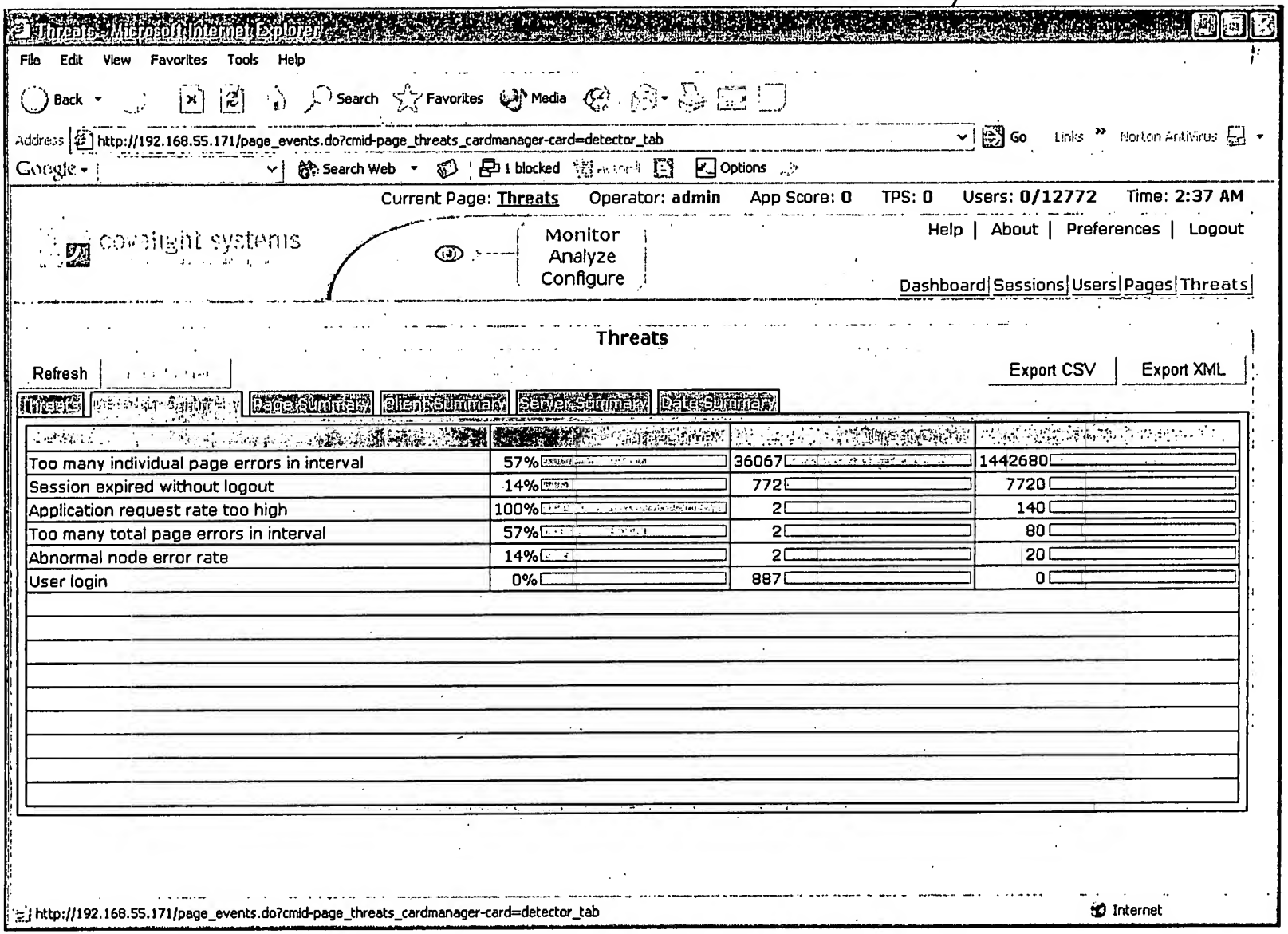
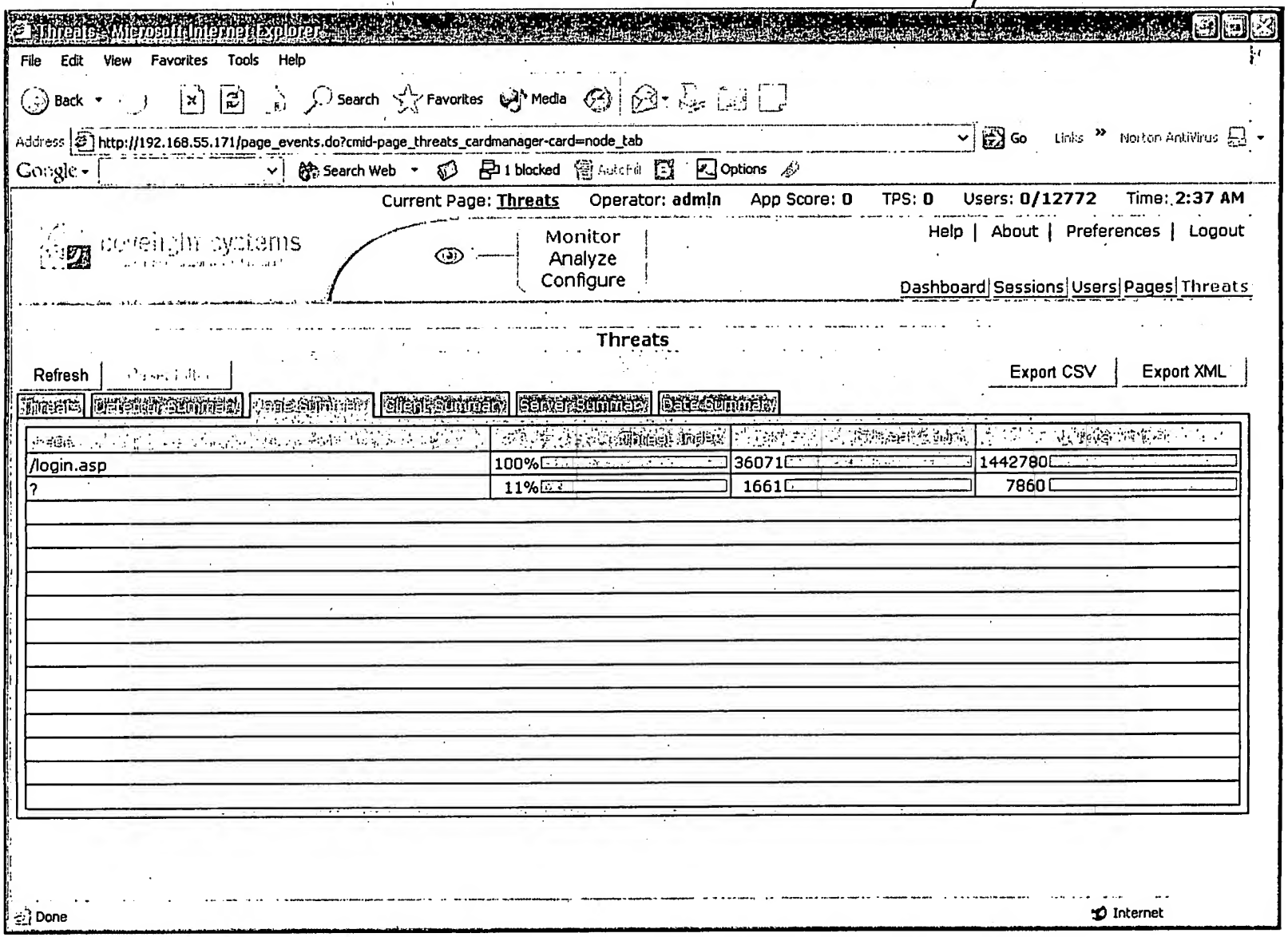


FIG. 46B



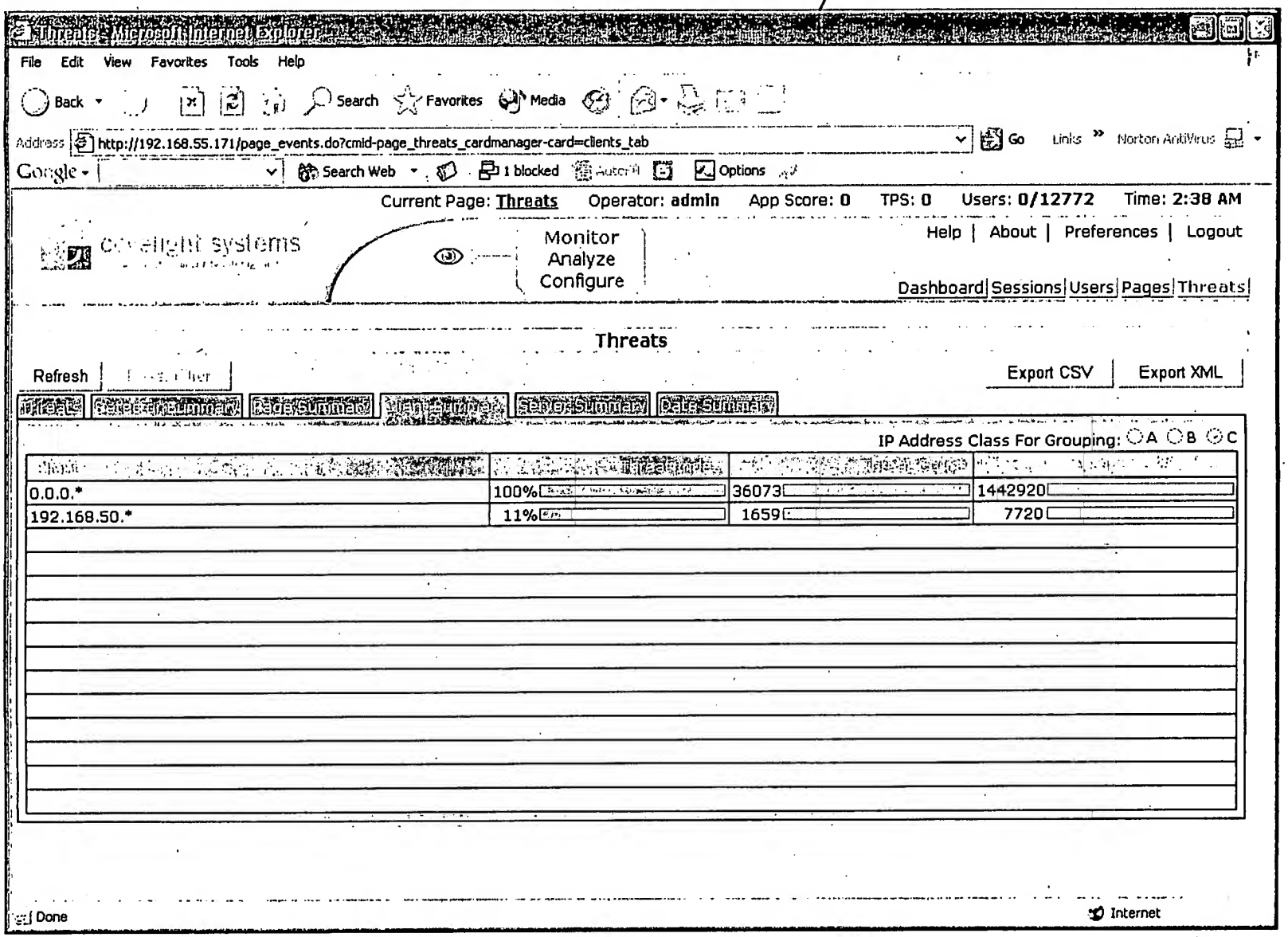
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 46C



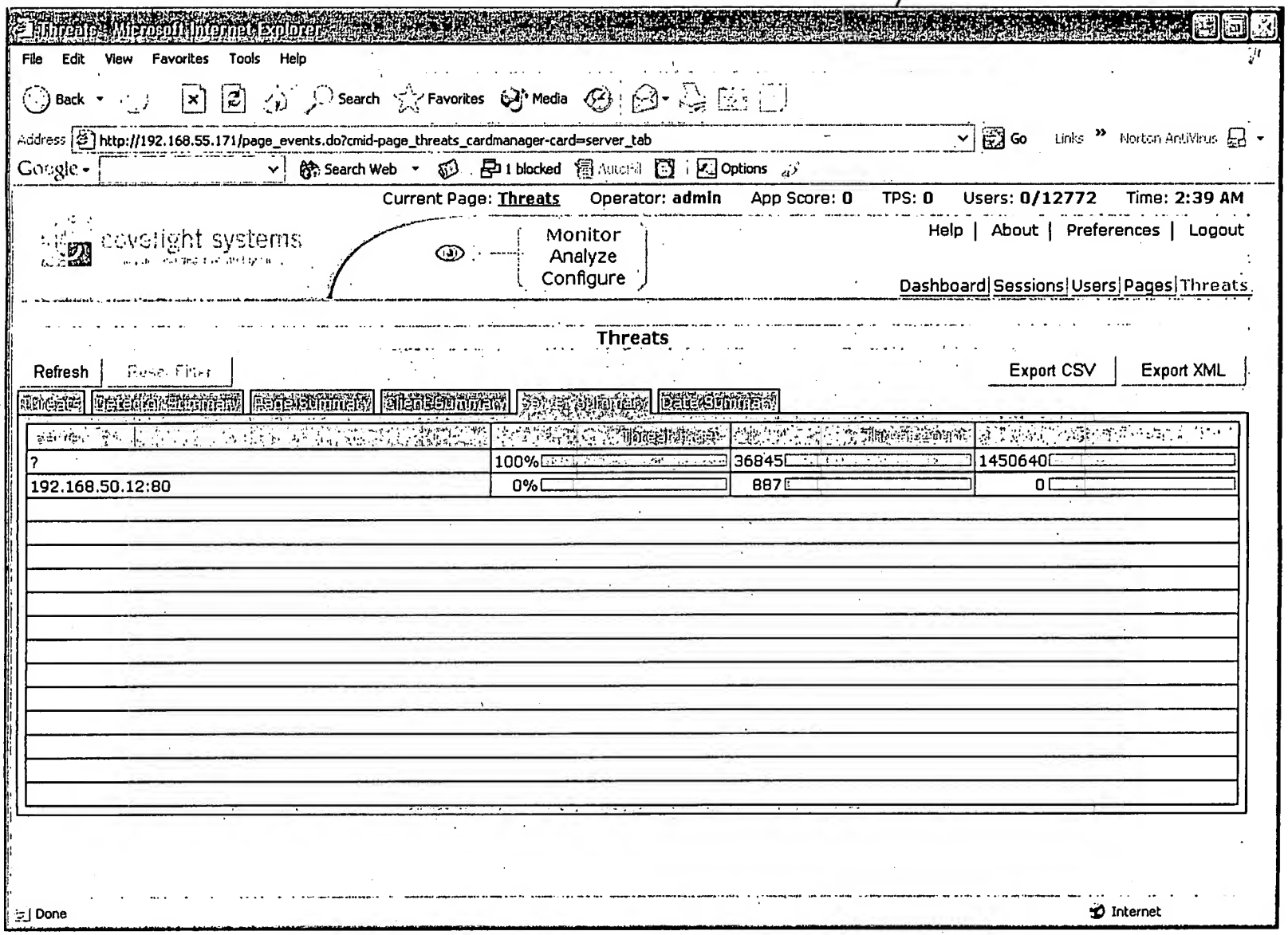
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 46D



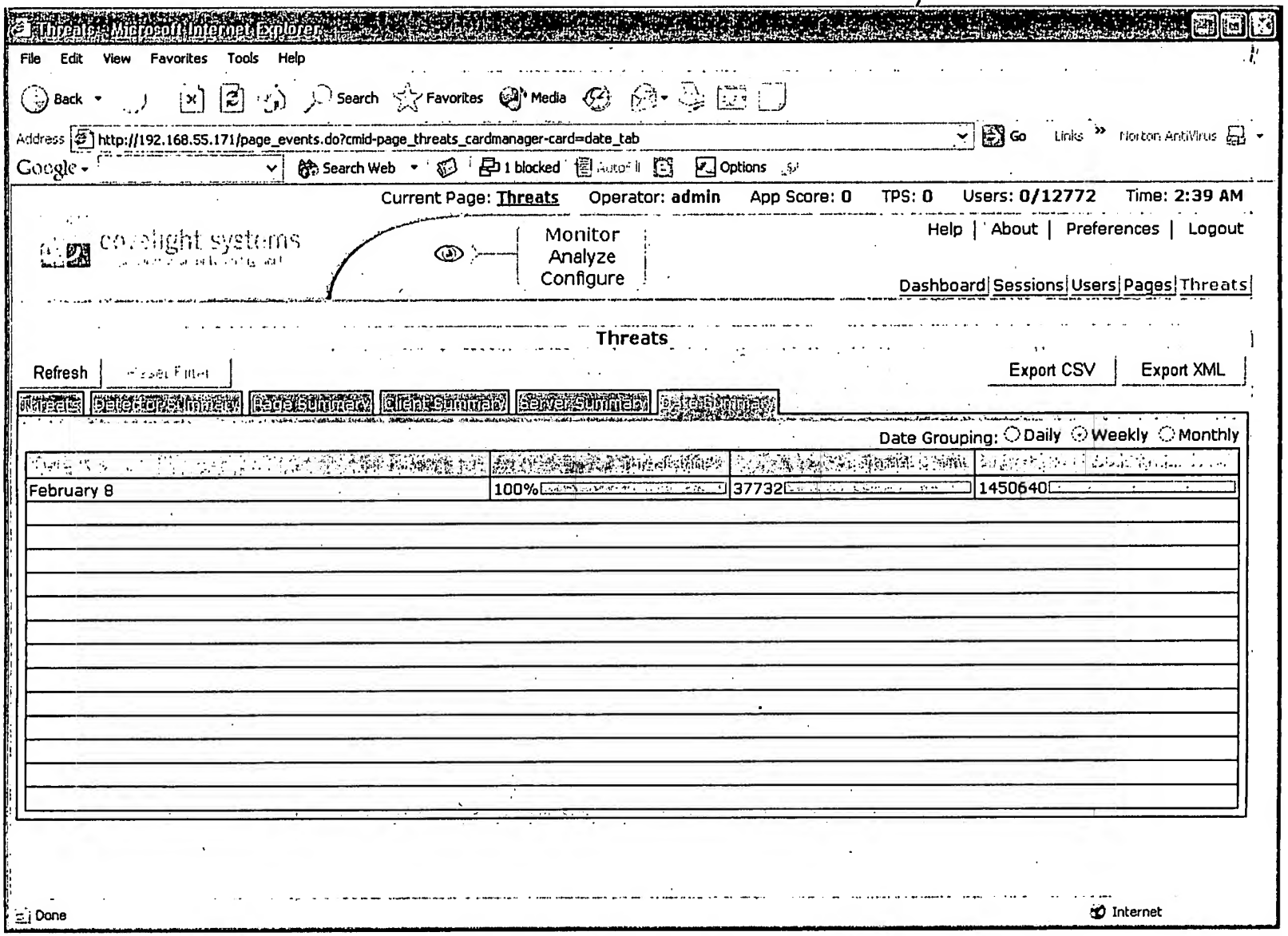
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 46E



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 46F

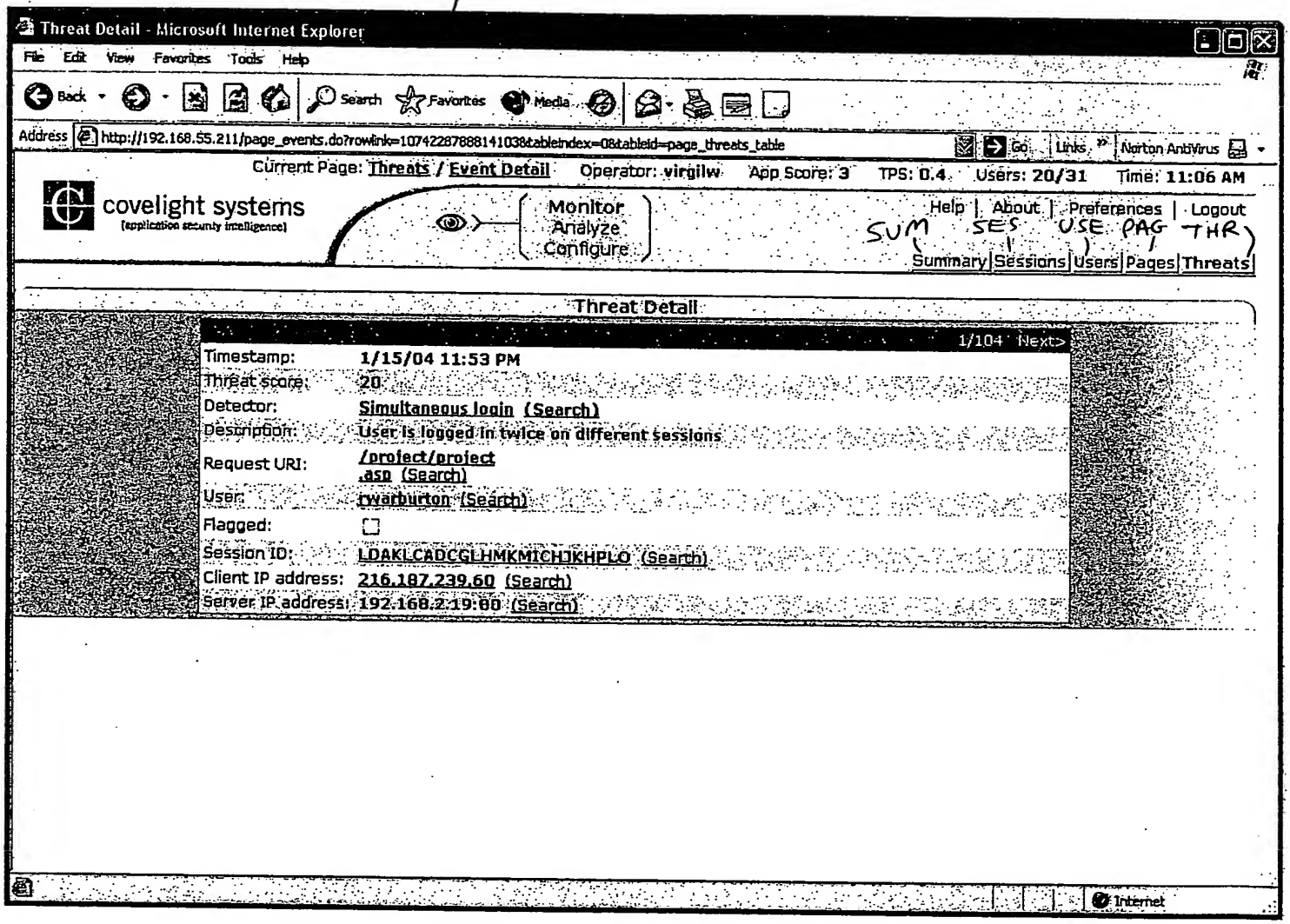


Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

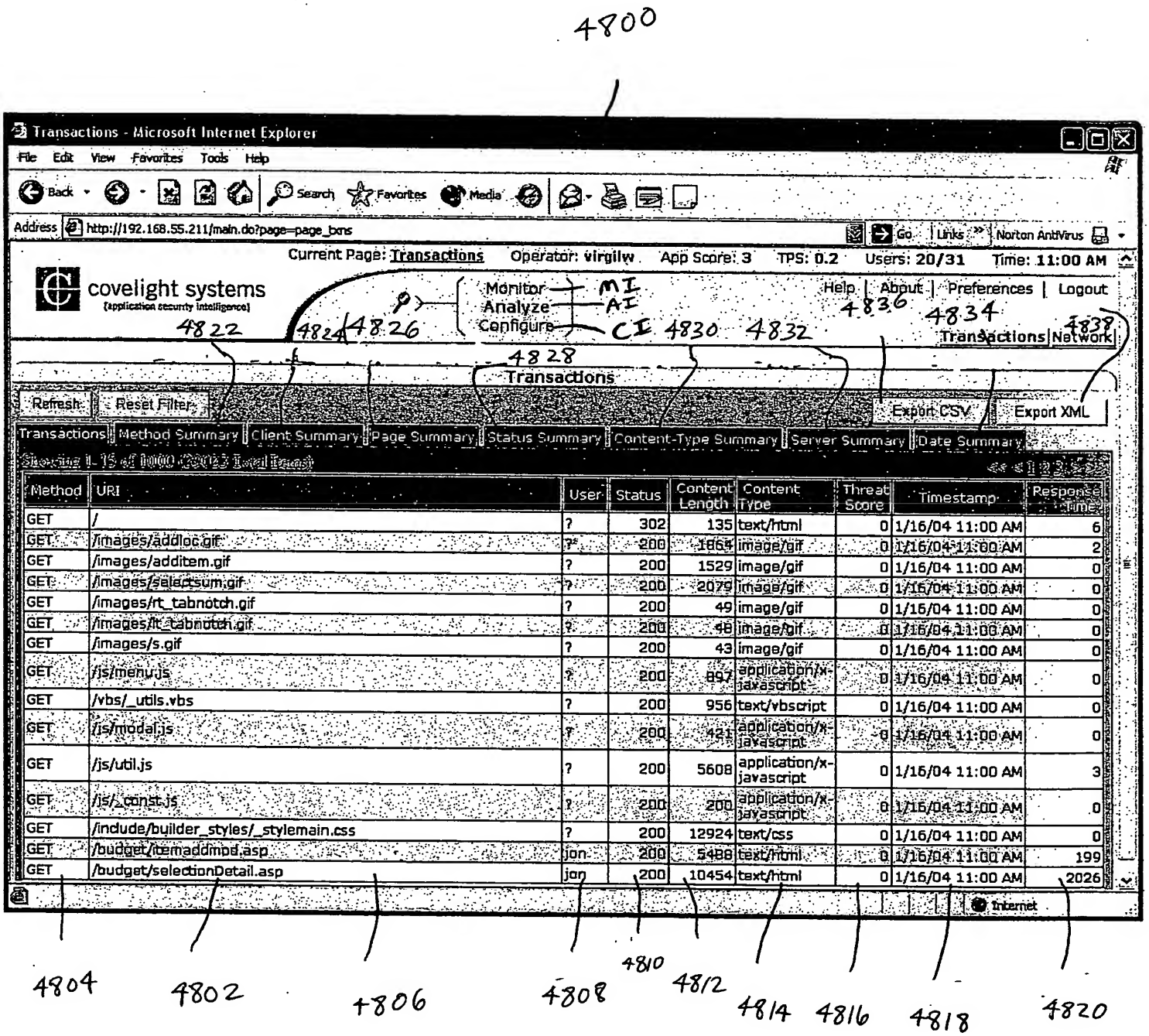
FIG. 47

4700



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

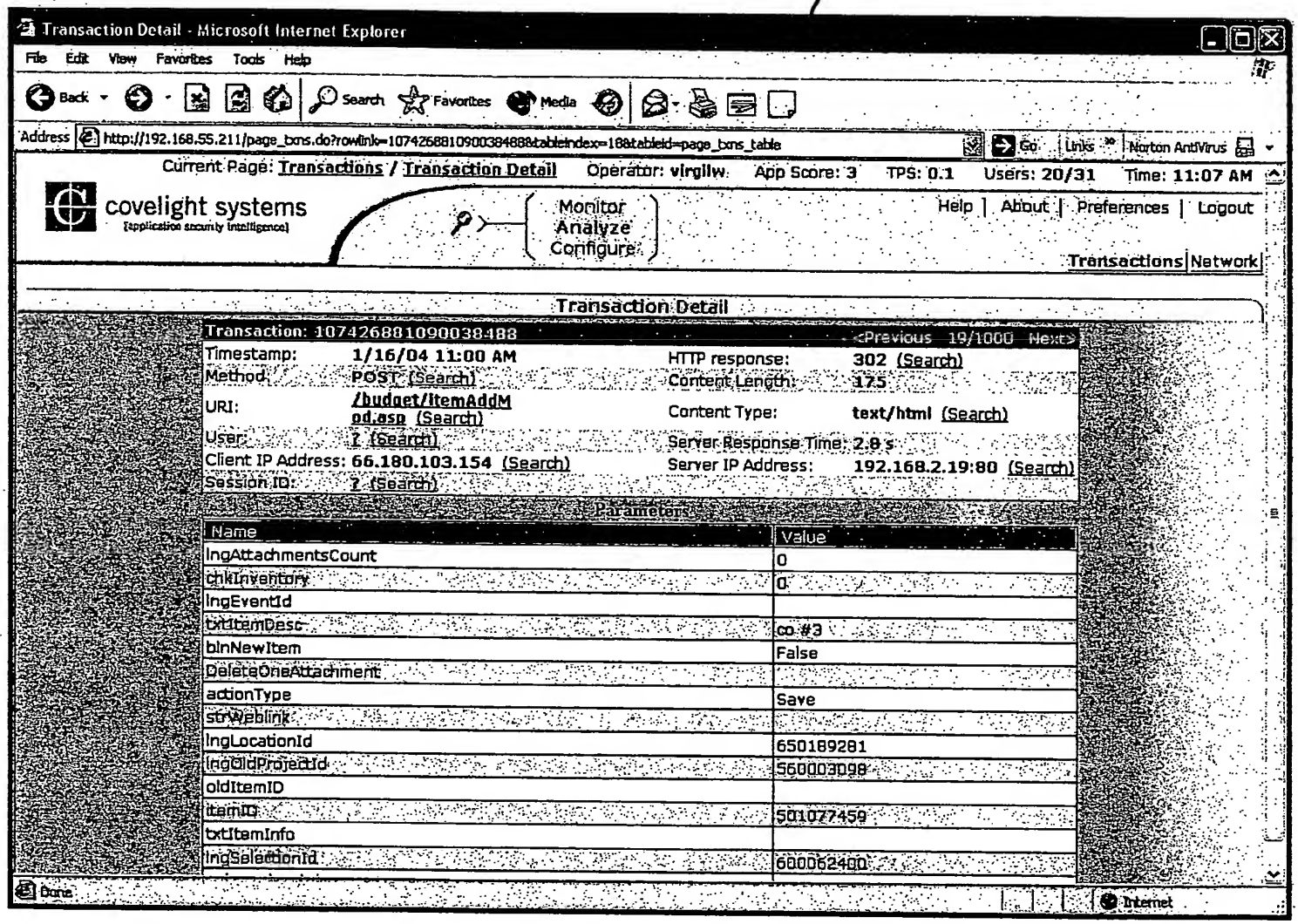
FIG. 48



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 49

4900

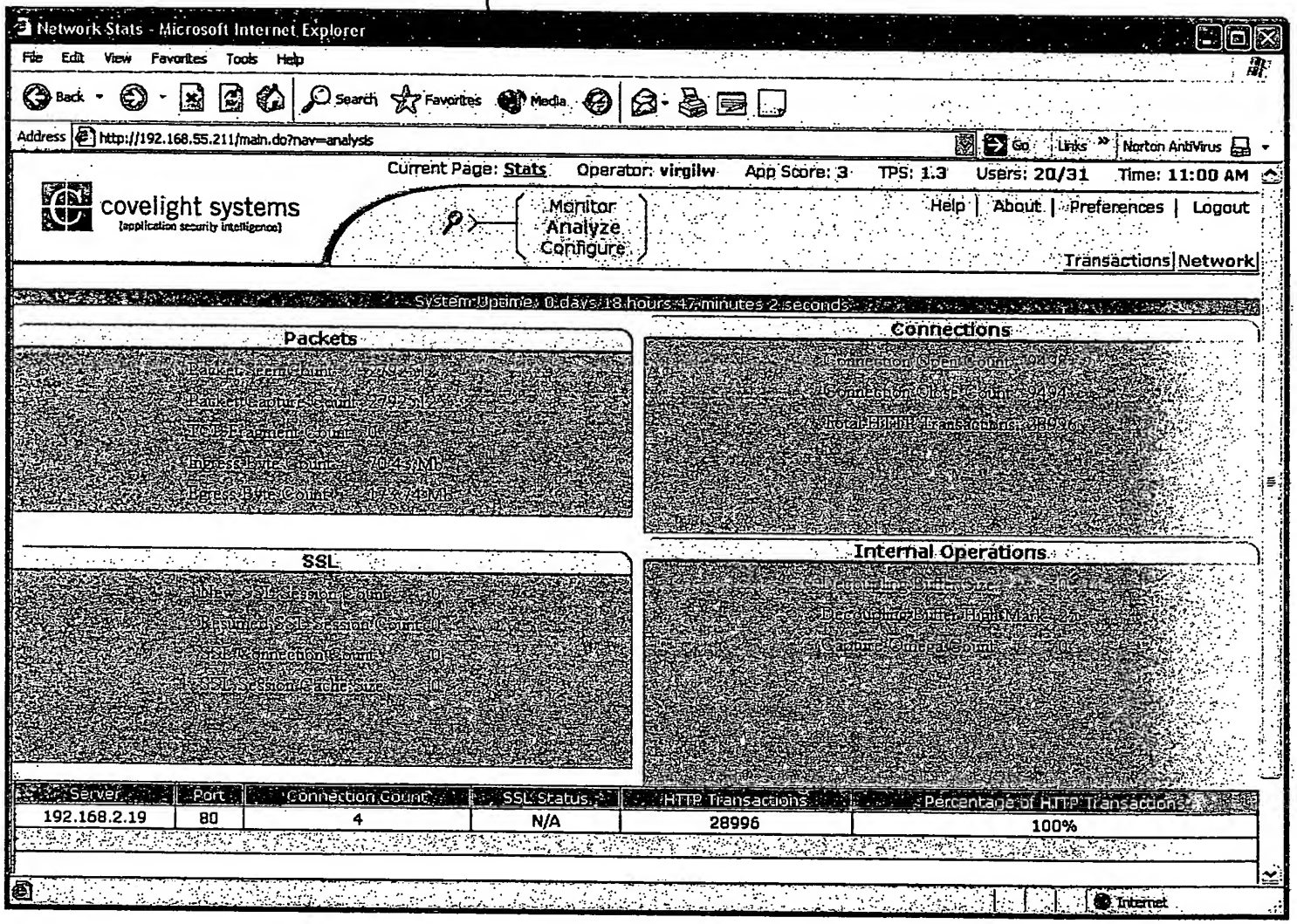


Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION

Atty Docket: 1503/9

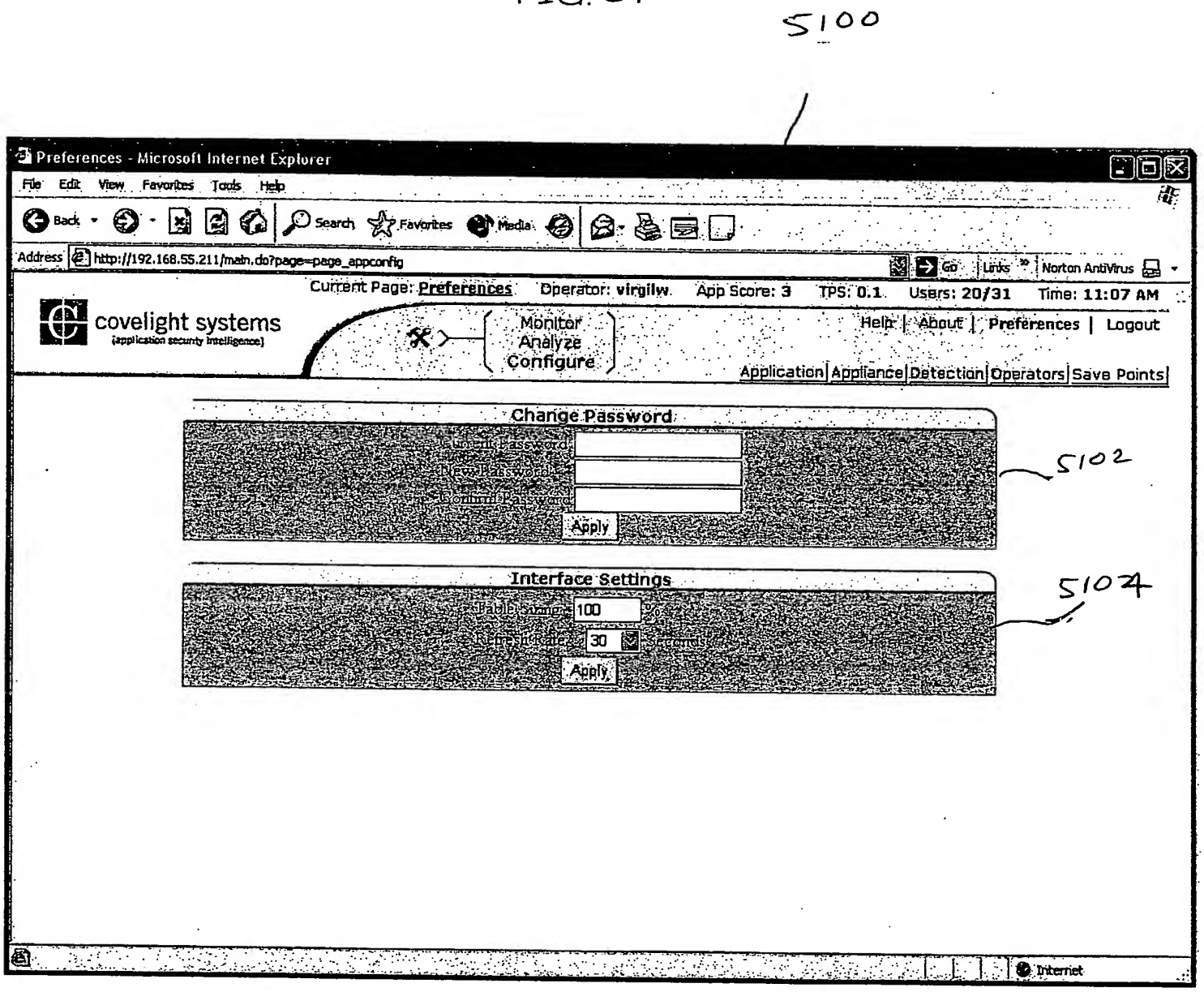
FIG. 50

5000



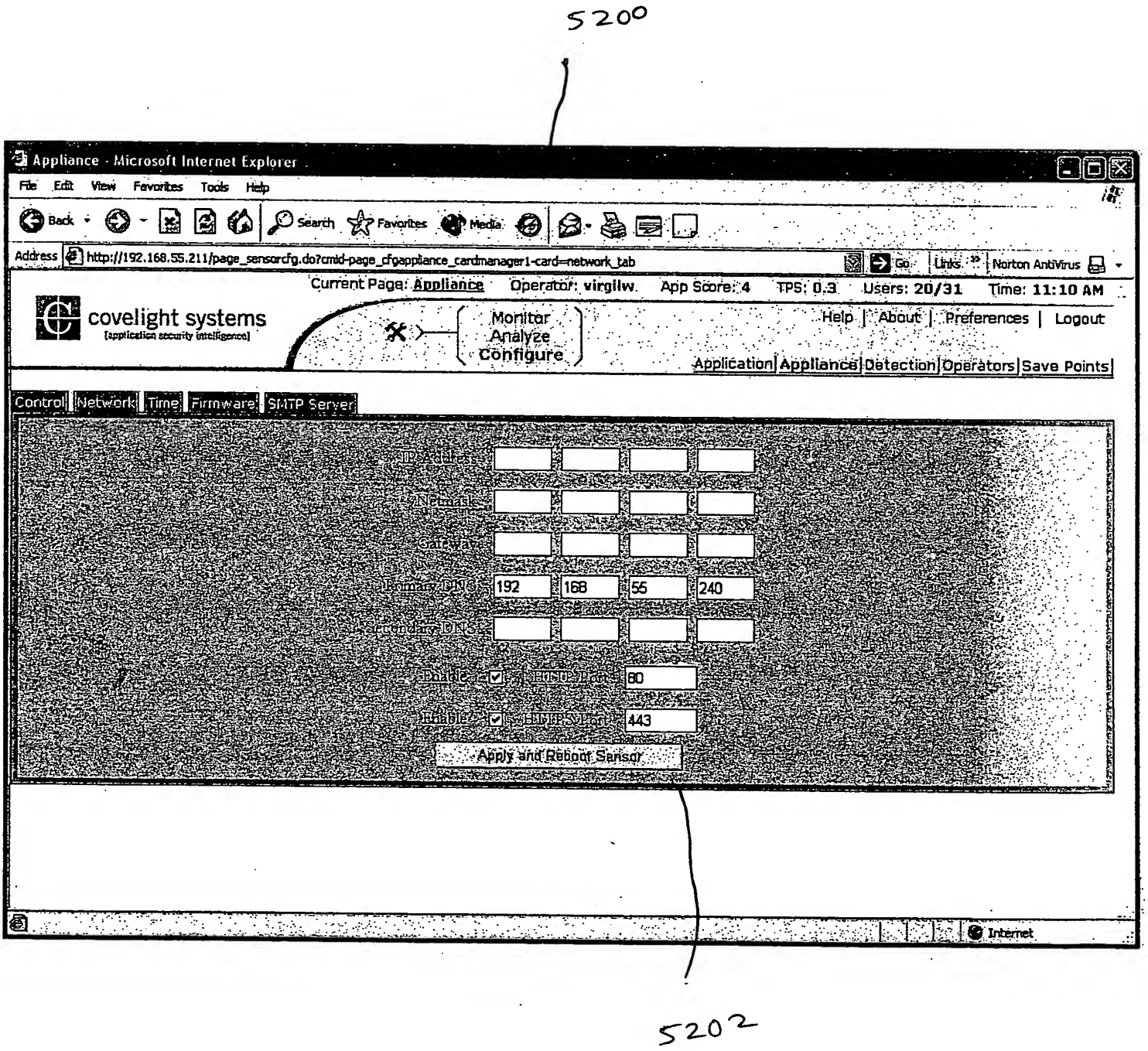
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 51



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

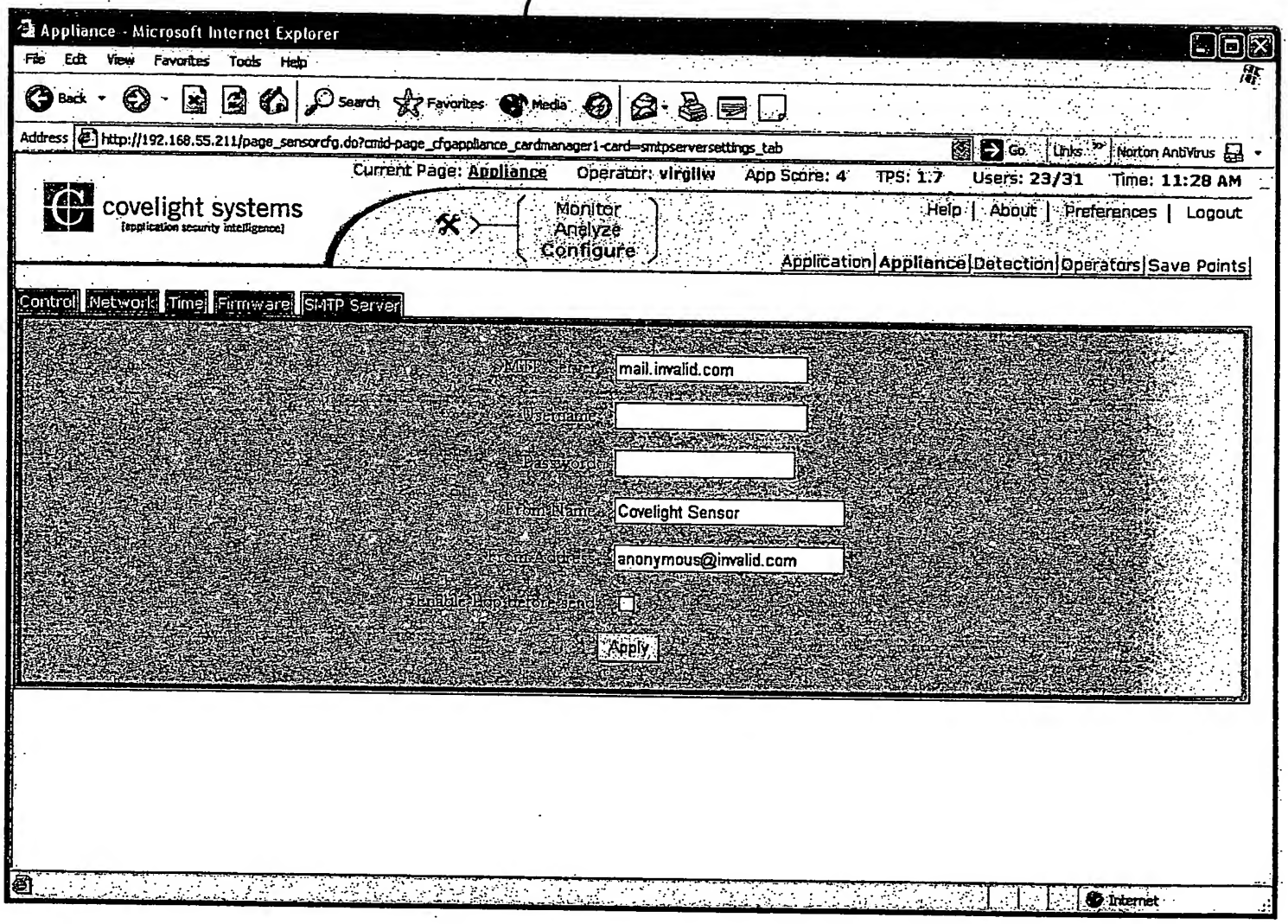
FIG. 52



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

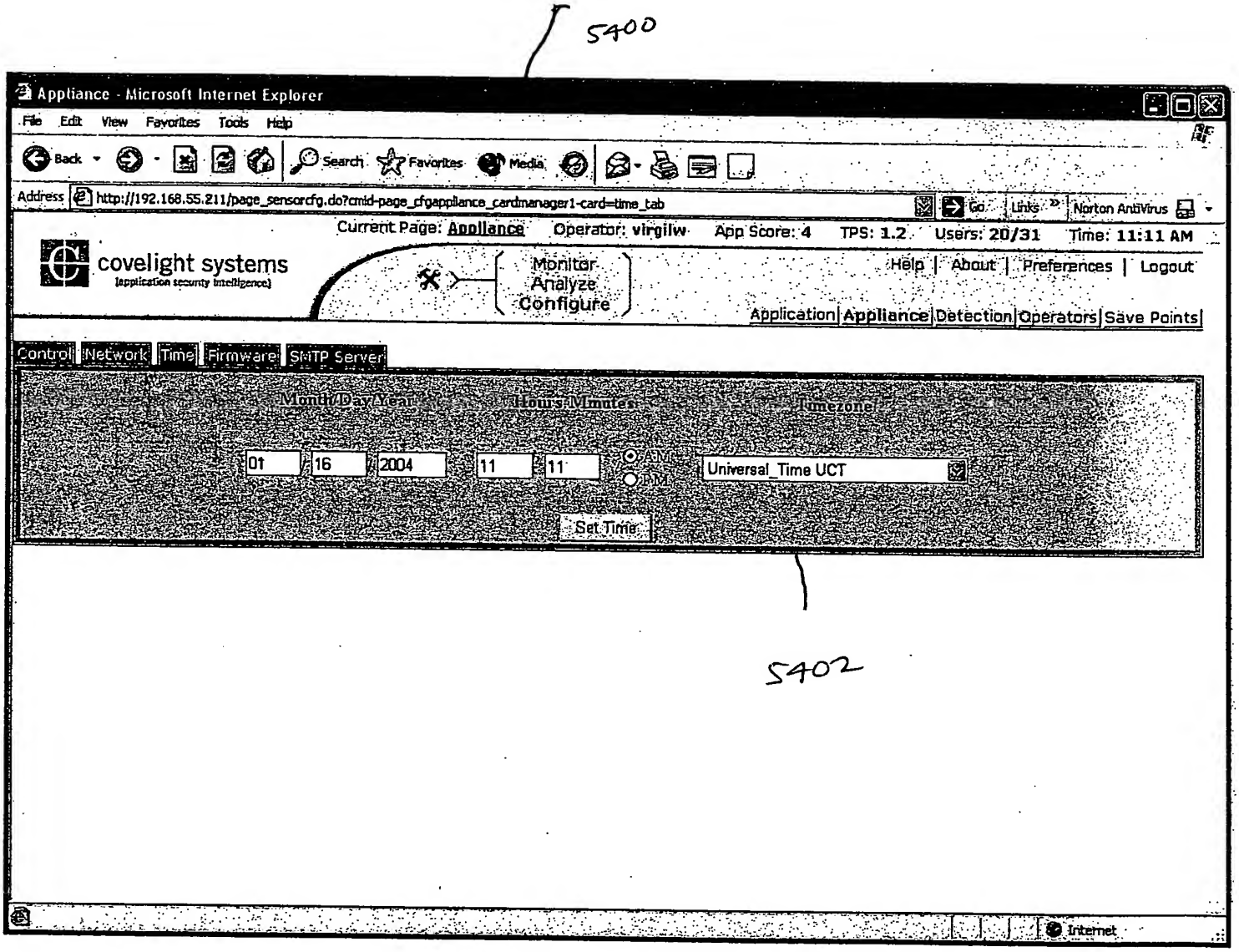
FIG. 53

5300



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

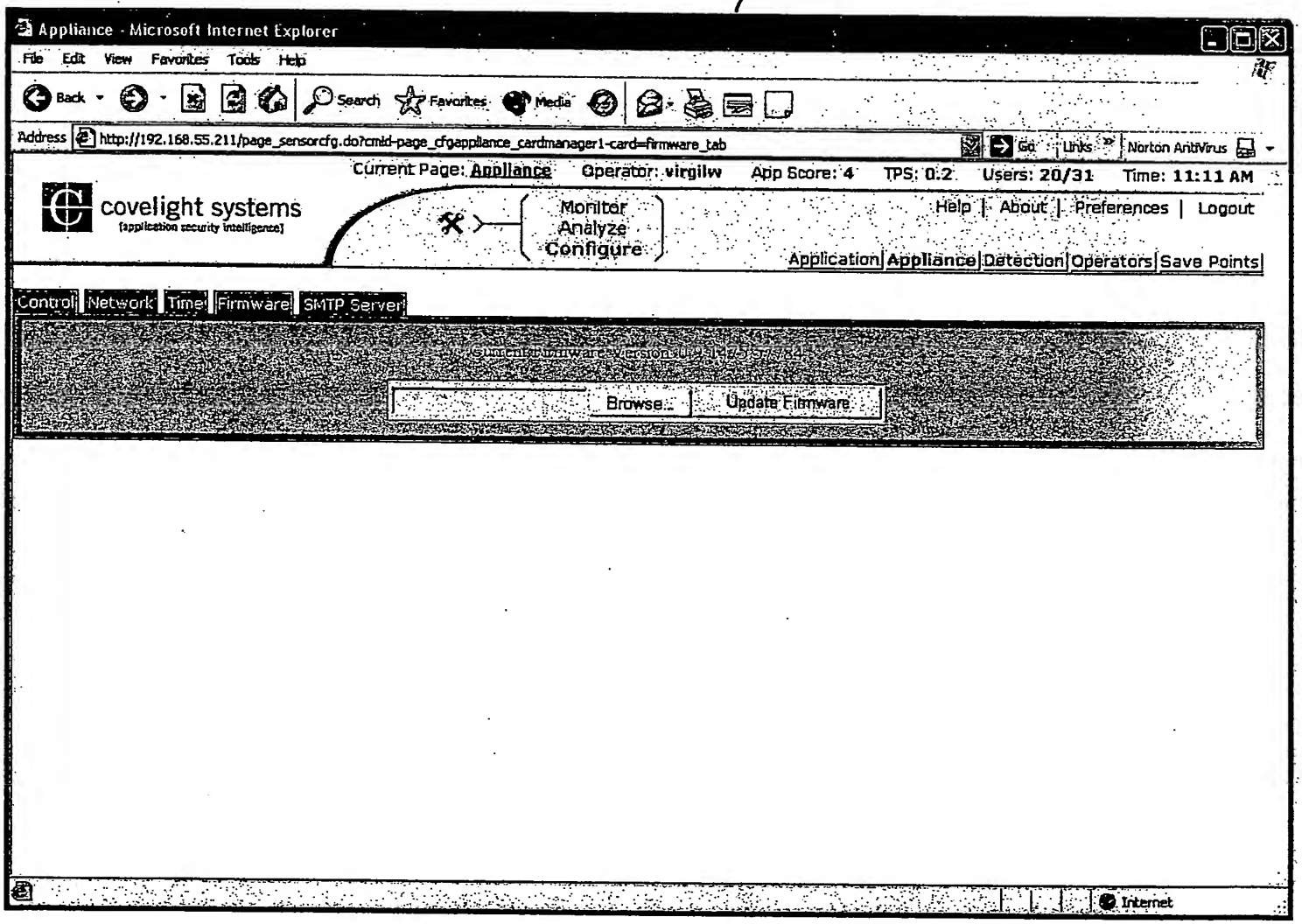
FIG. 54



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 55

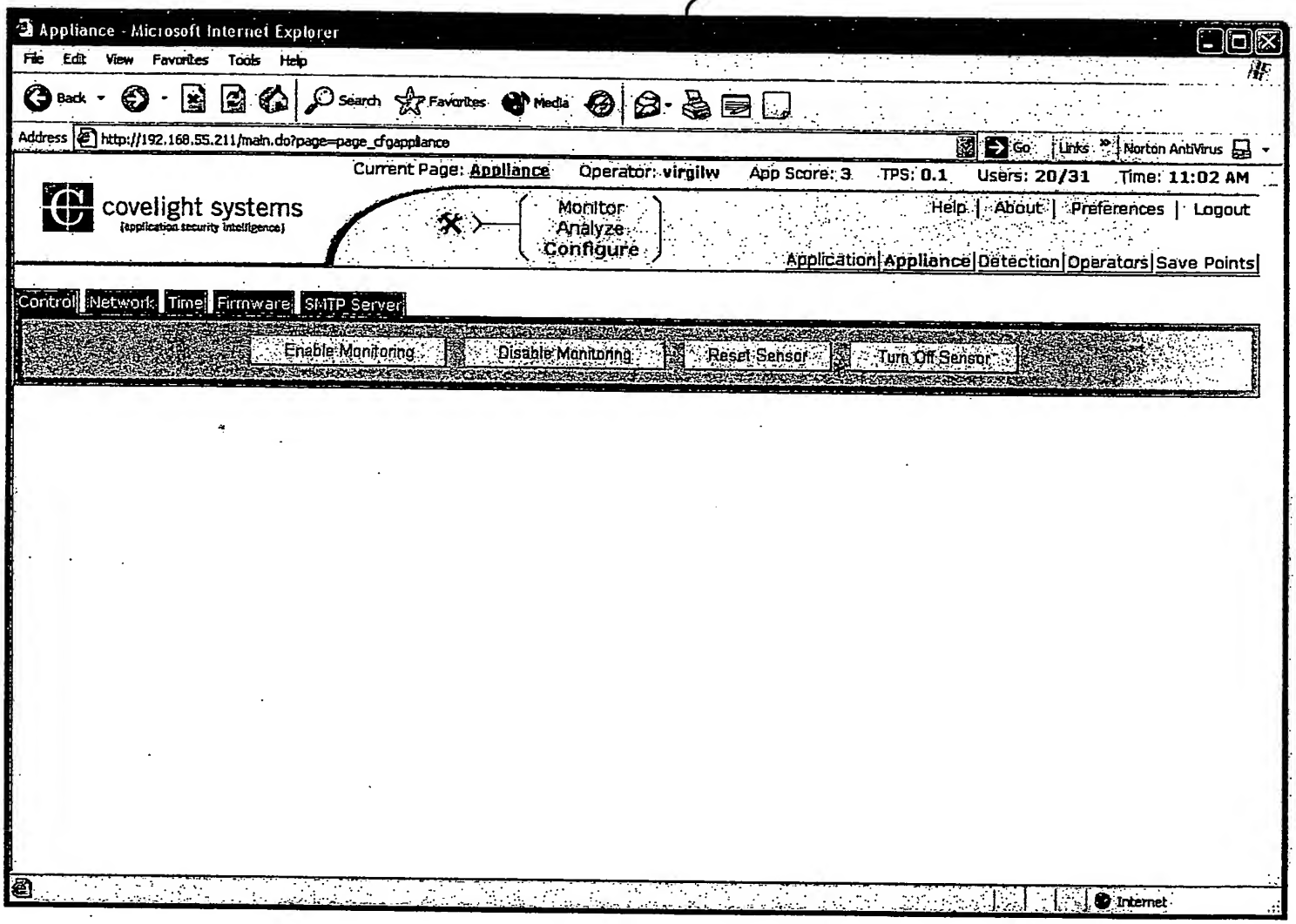
5500



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 56

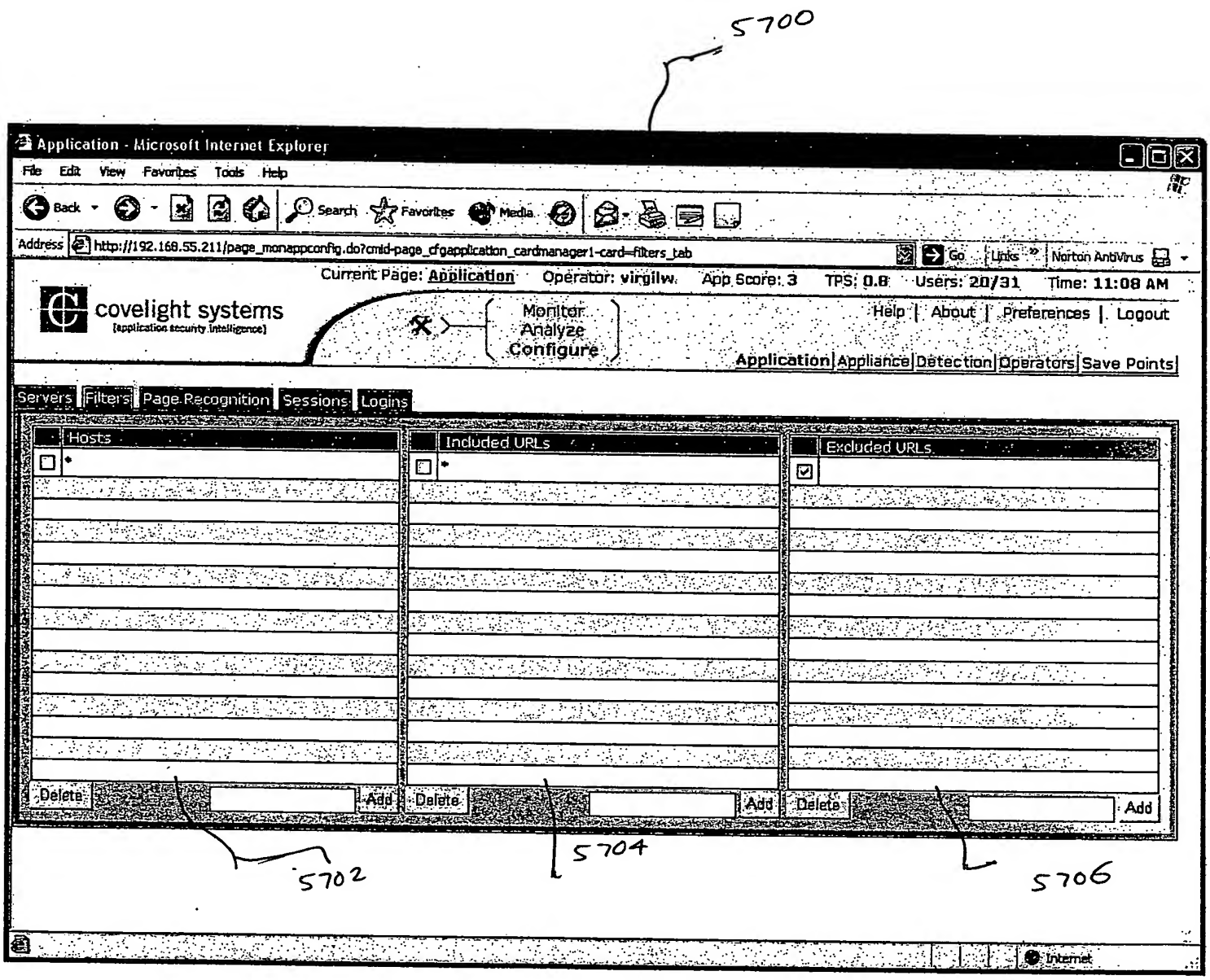
5600



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION

Atty Docket: 1503/9

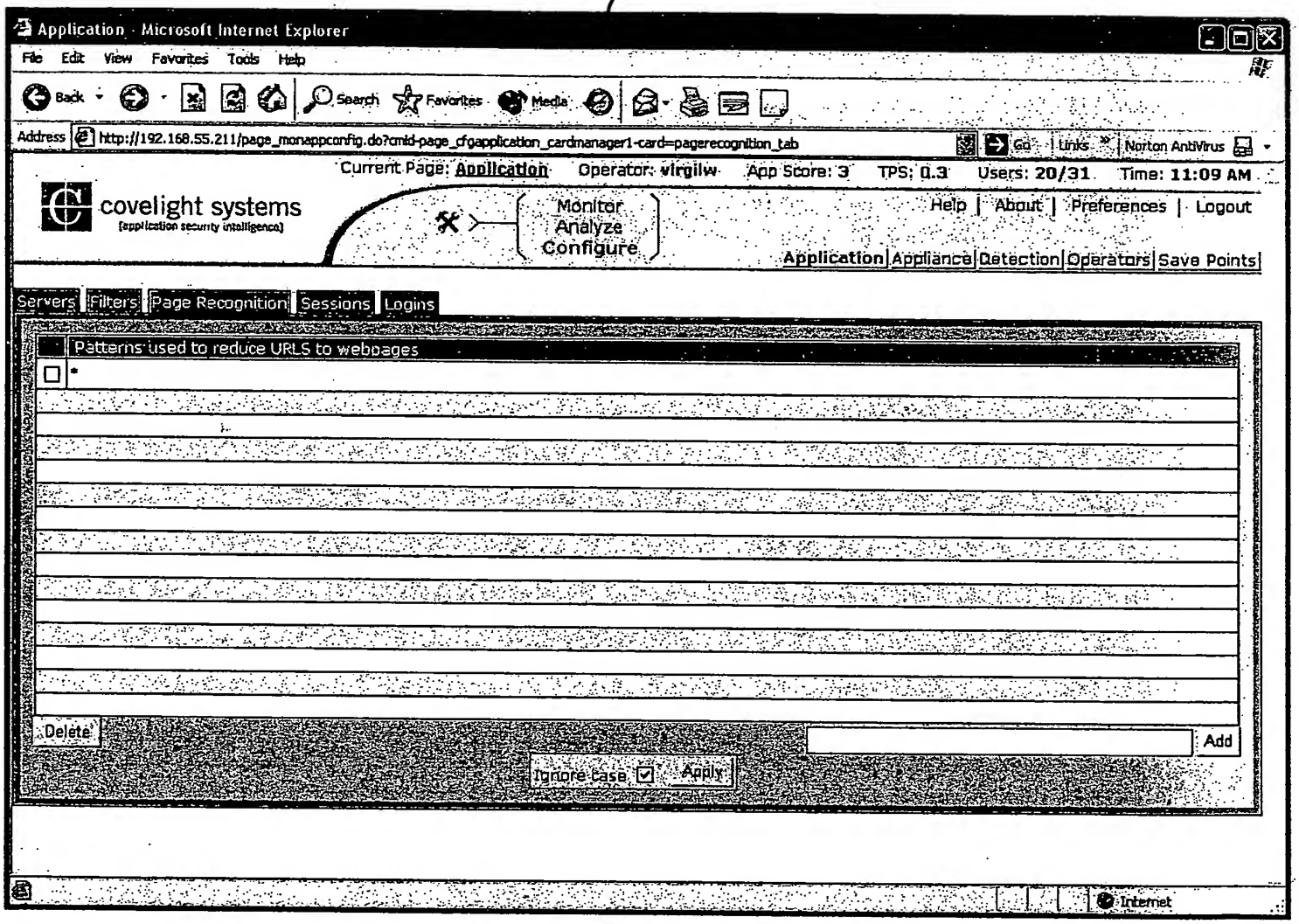
FIG. 57



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

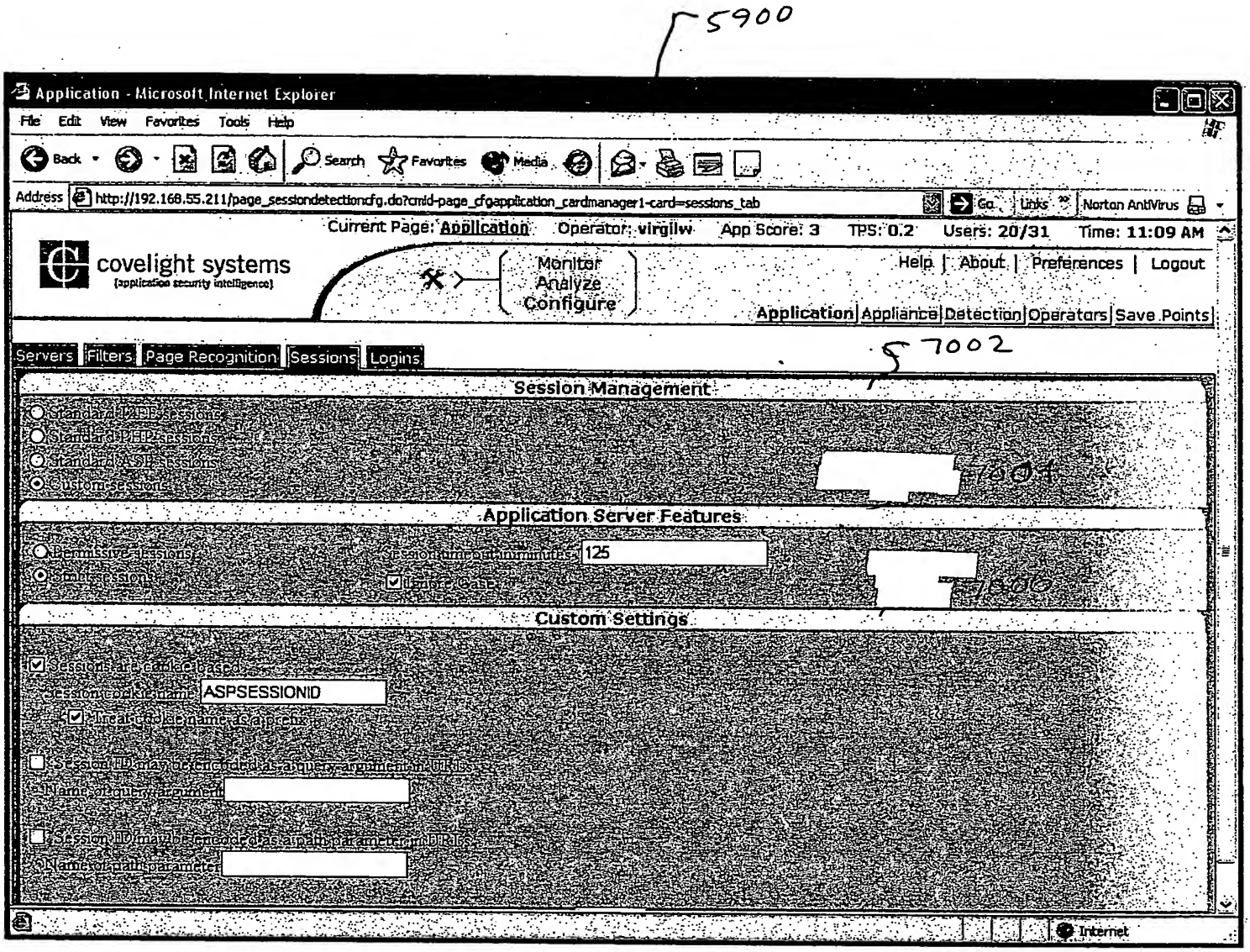
FIG. 58

5800



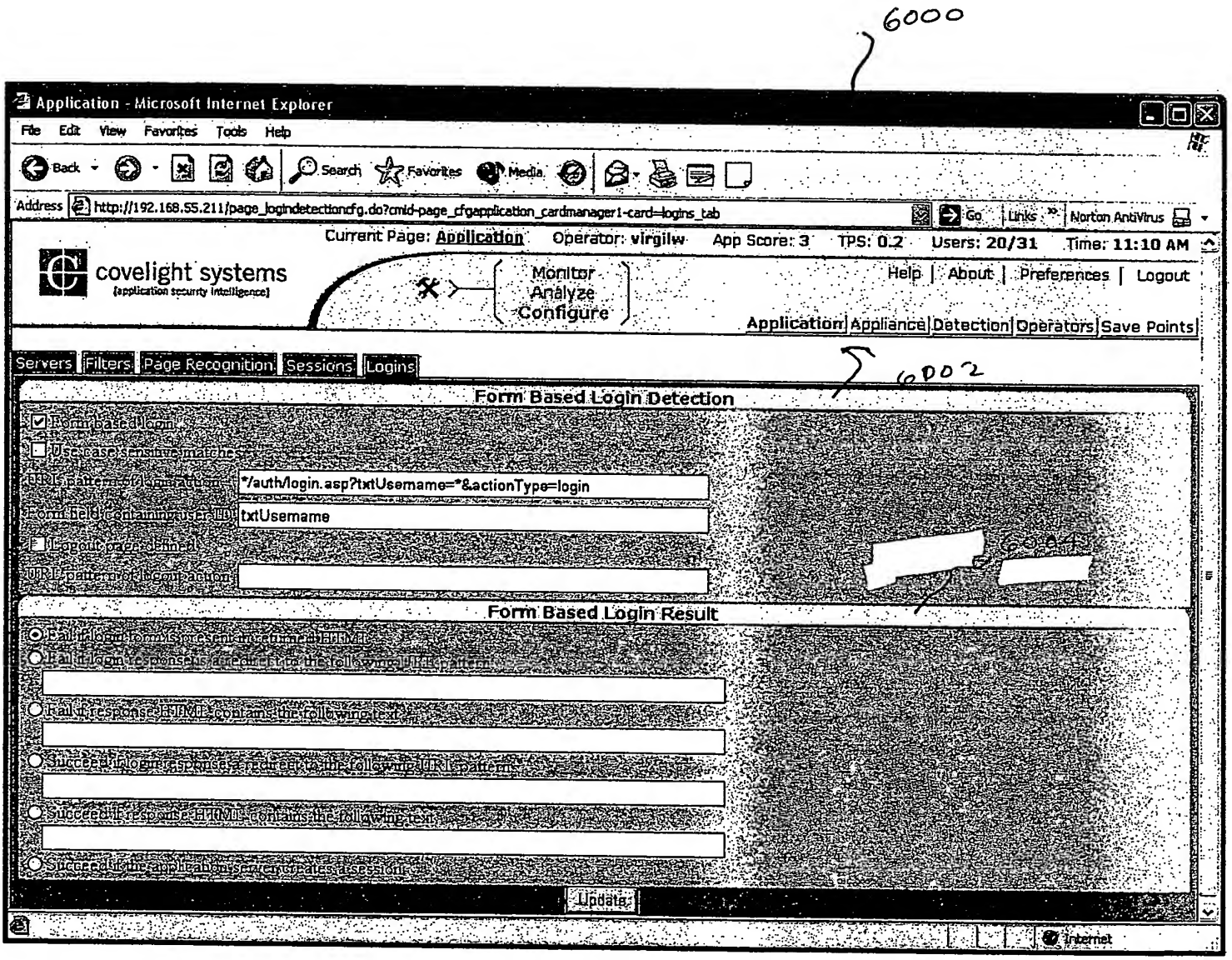
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 59



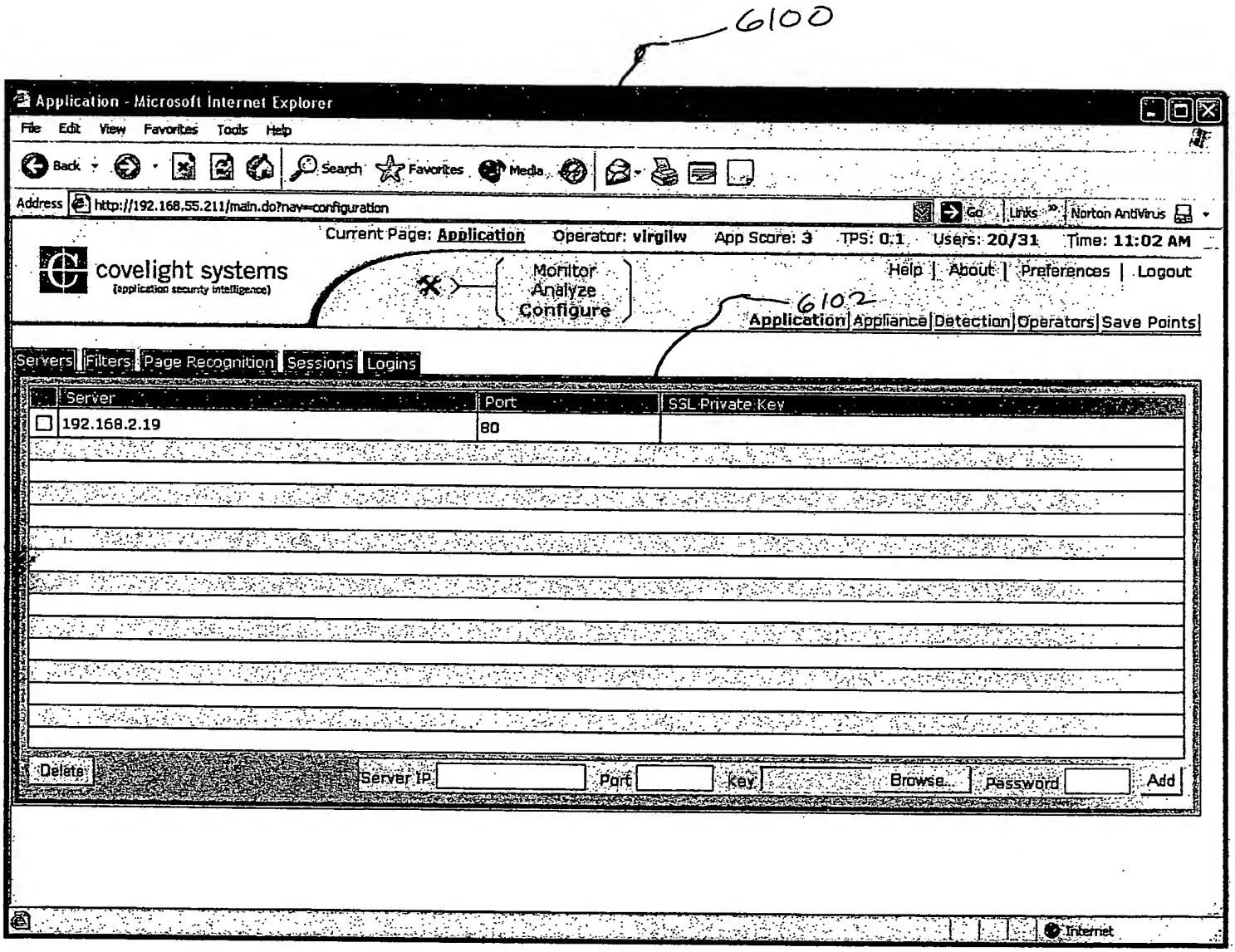
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 60



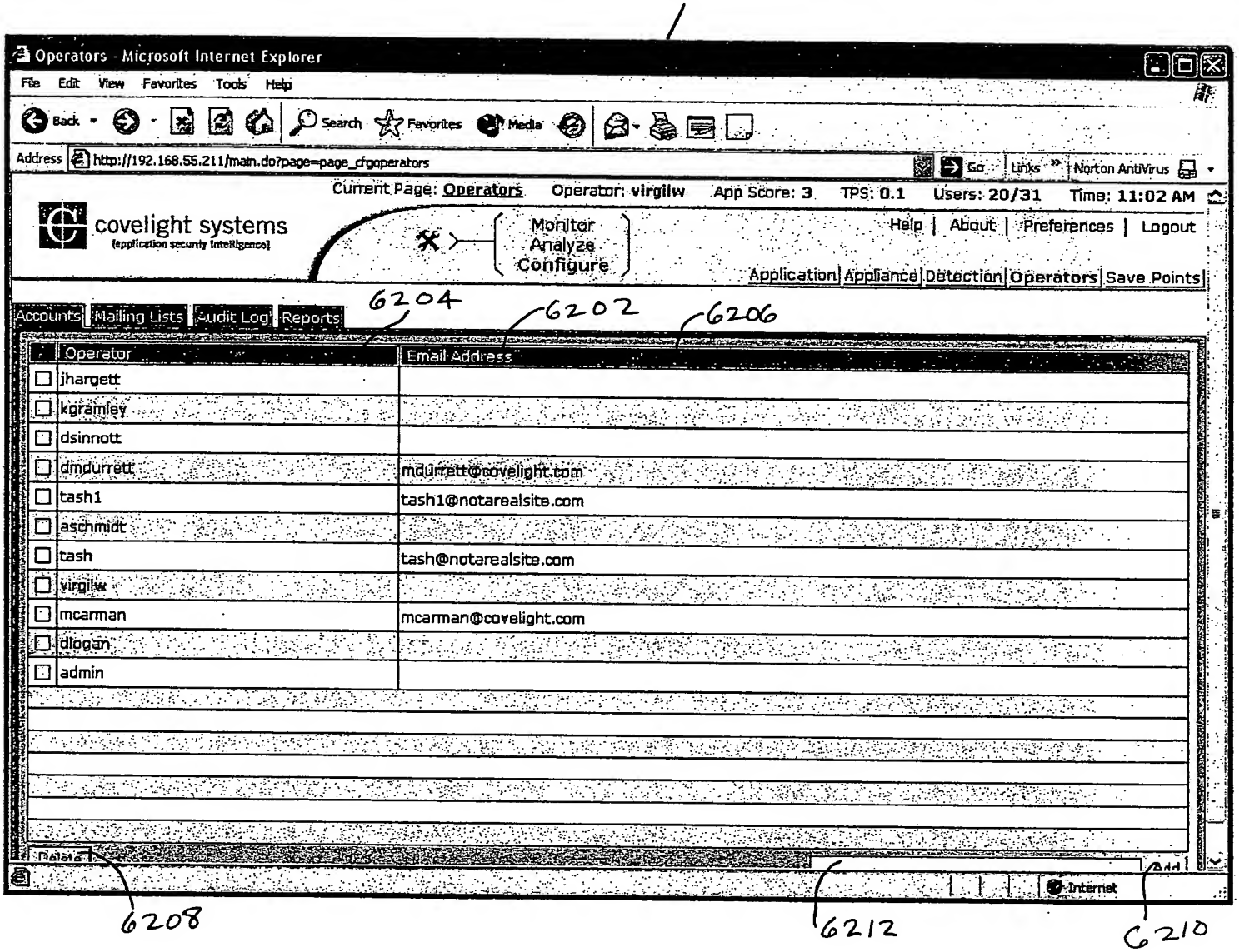
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 61



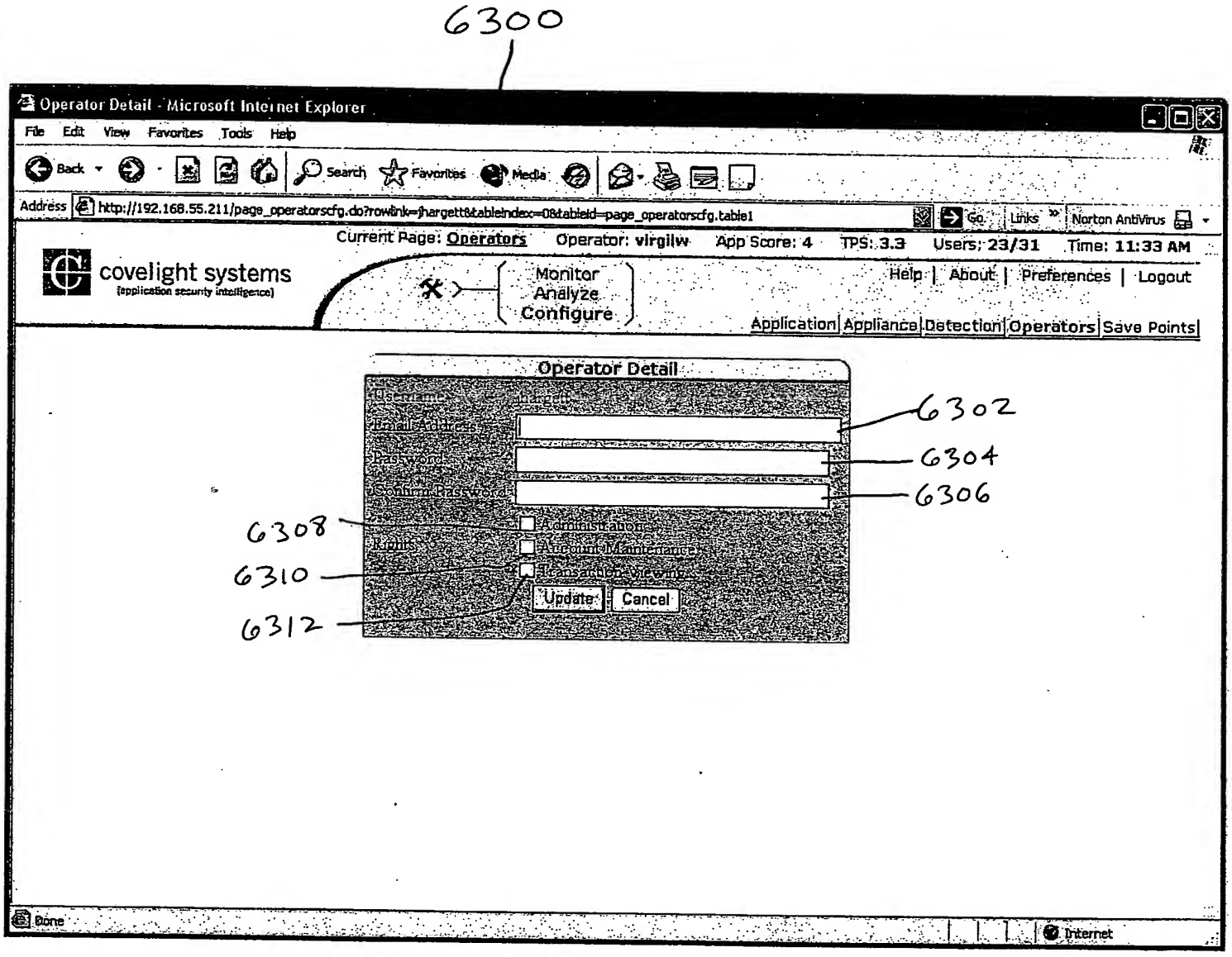
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 62



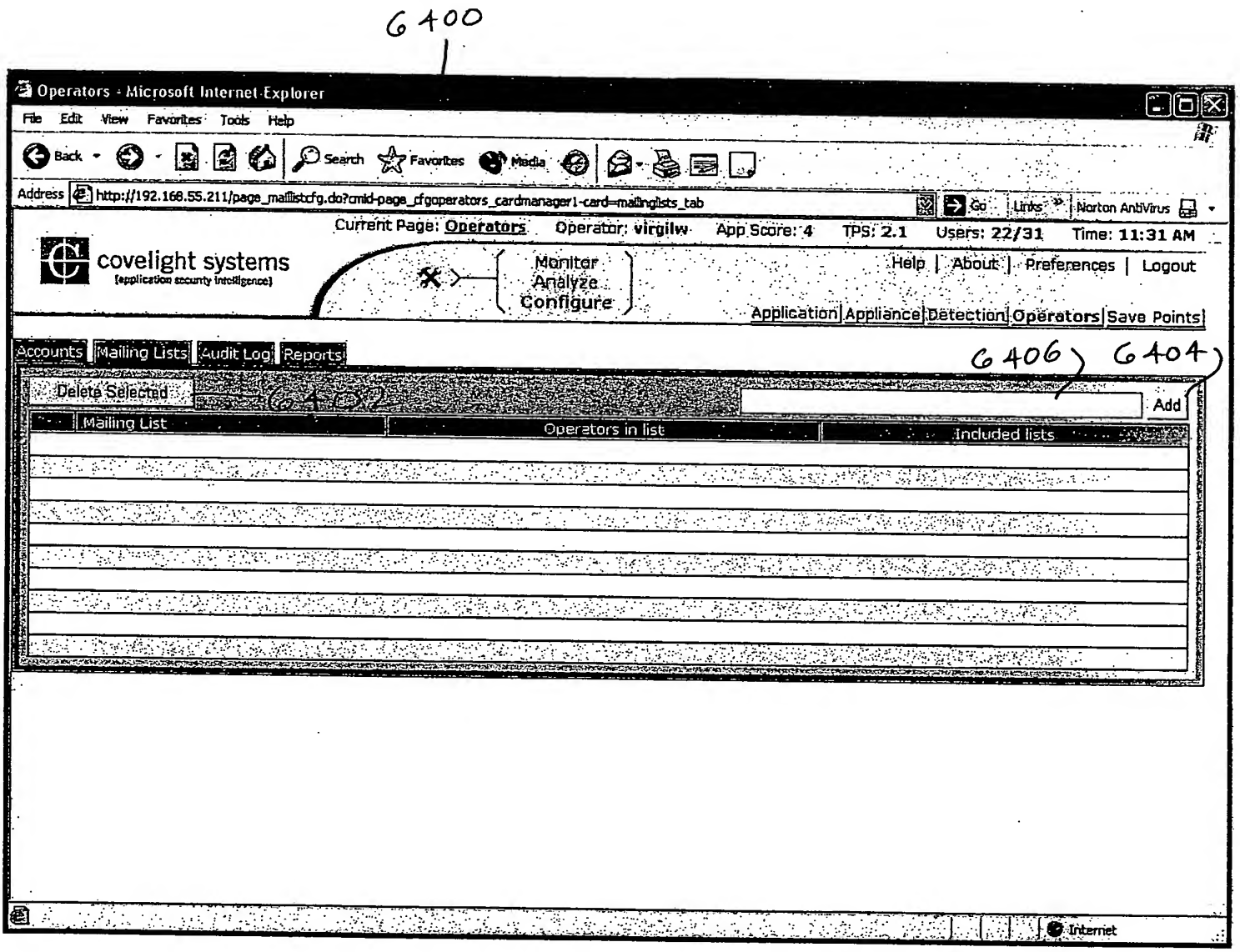
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 63



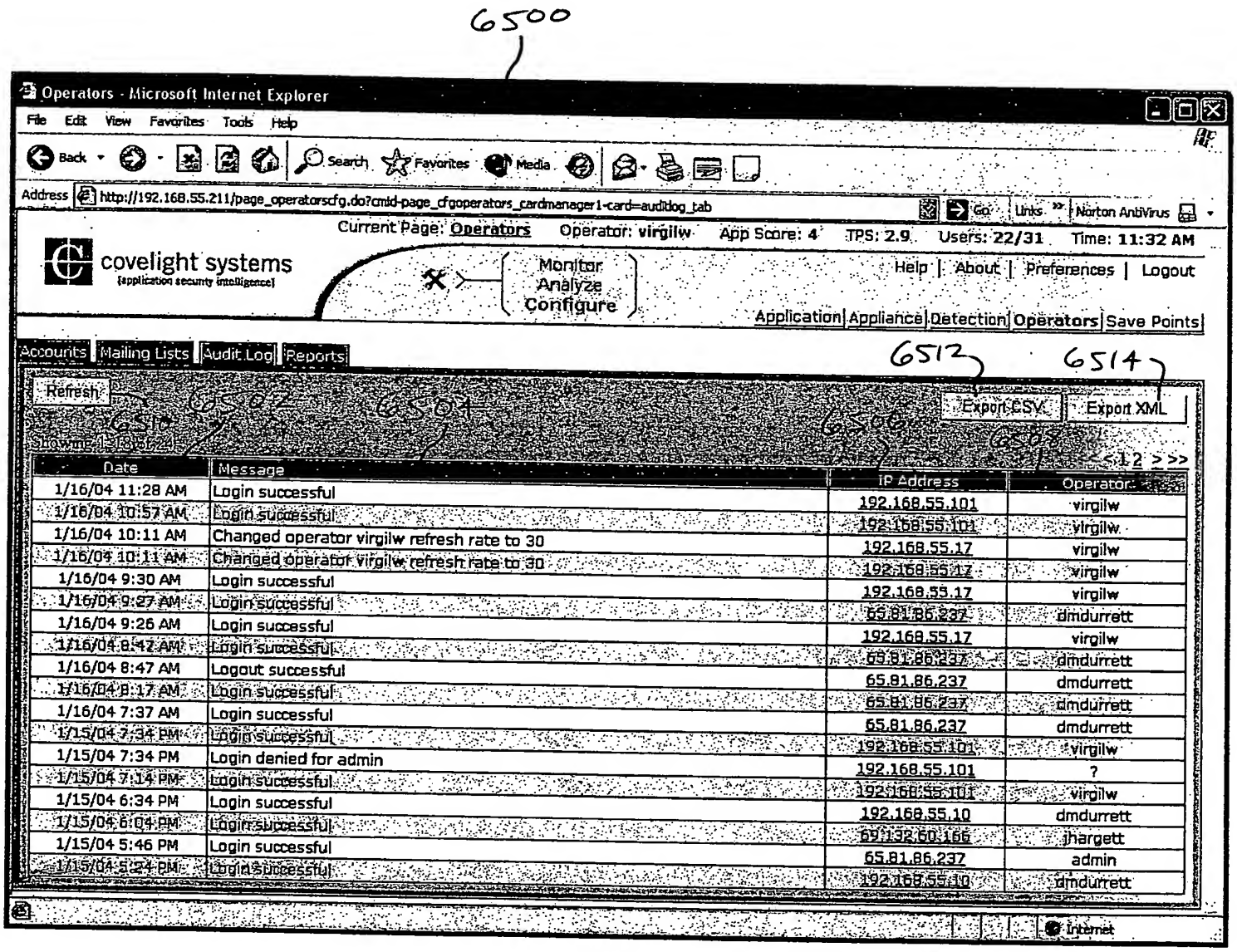
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 64



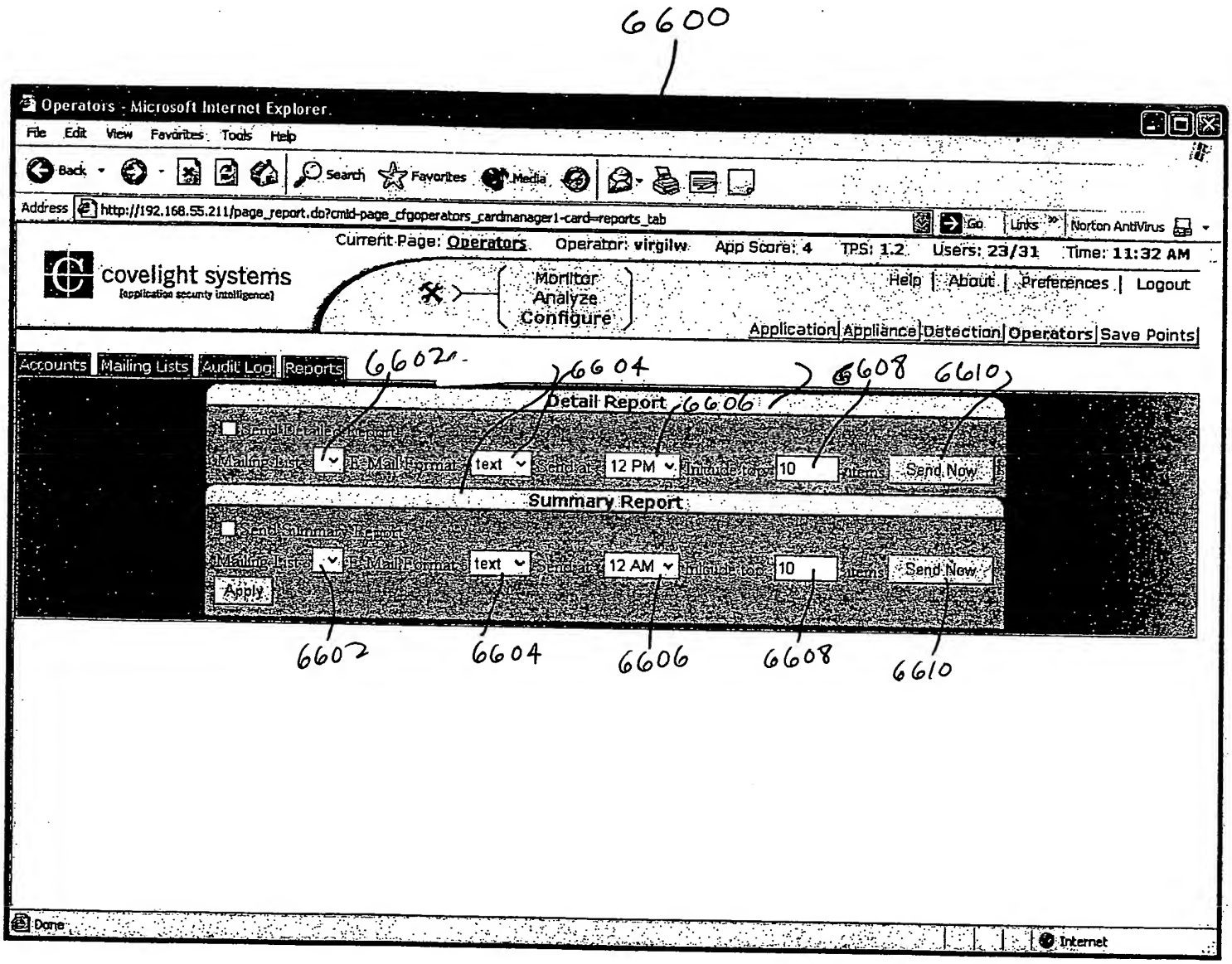
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 65



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 66



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 67

6700

Detection - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://192.168.55.211/main.do?page=page_cfgdetection

Go Links Norton AntiVirus

Current Page: Detection Operator: virgilw App Score: 3 TPS: 0.1 Users: 20/31 Time: 11:02 AM

covelight systems
[application security intelligence]

Monitor
Analyze
Configure

Help | About | Preferences | Logout

Application | Appliance | Detection | Operators | Save Points

Detectors | Global Scoring Adjustment | Access Lists

Showing 1-15 of 43

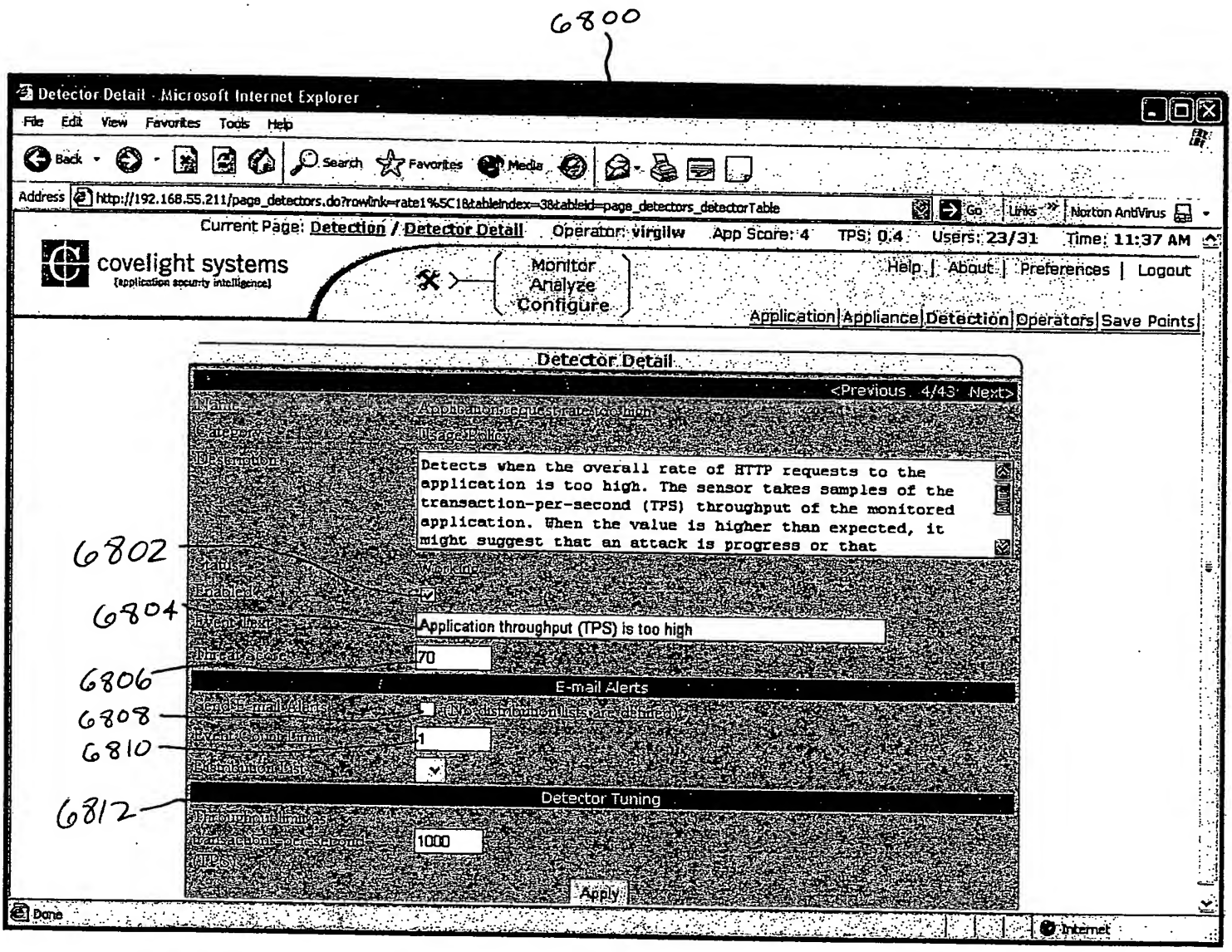
Name ▲	Category	Score	Status
Abnormal node error rate	Application Errors	10	Working
Abnormal session duration	Application Misuse	10	Learning
Abnormal user session duration	Application Misuse	10	Working
Application request rate too high	Usage Policy	70	Working
Consecutive login failures	Authentication	30	Working
Disallowed IP address	Access Policy	10	Disabled
Encoded 8-bit character	URL Encoding	5	Working
Excessive individual HTTP errors	HTTP Protocol	40	Working
Excessive login failures	Authentication	10	Learning
Excessive total HTTP errors	HTTP Protocol	40	Working
Flagged user login	Access Policy	50	Working
HTTP buffer overflow	HTTP Protocol	80	Working
HTTP parsing error	HTTP Protocol	80	Working
Invalid % character	URL Encoding	50	Working
Invalid HTTP request	HTTP Protocol	80	Working
Invalid URL encoding	URL Encoding	80	Working
Invalid UTF-8 sequence	URL Encoding	20	Working
Invalid use of %u	URL Encoding	60	Working

6702 6704 6706 6708

Internet

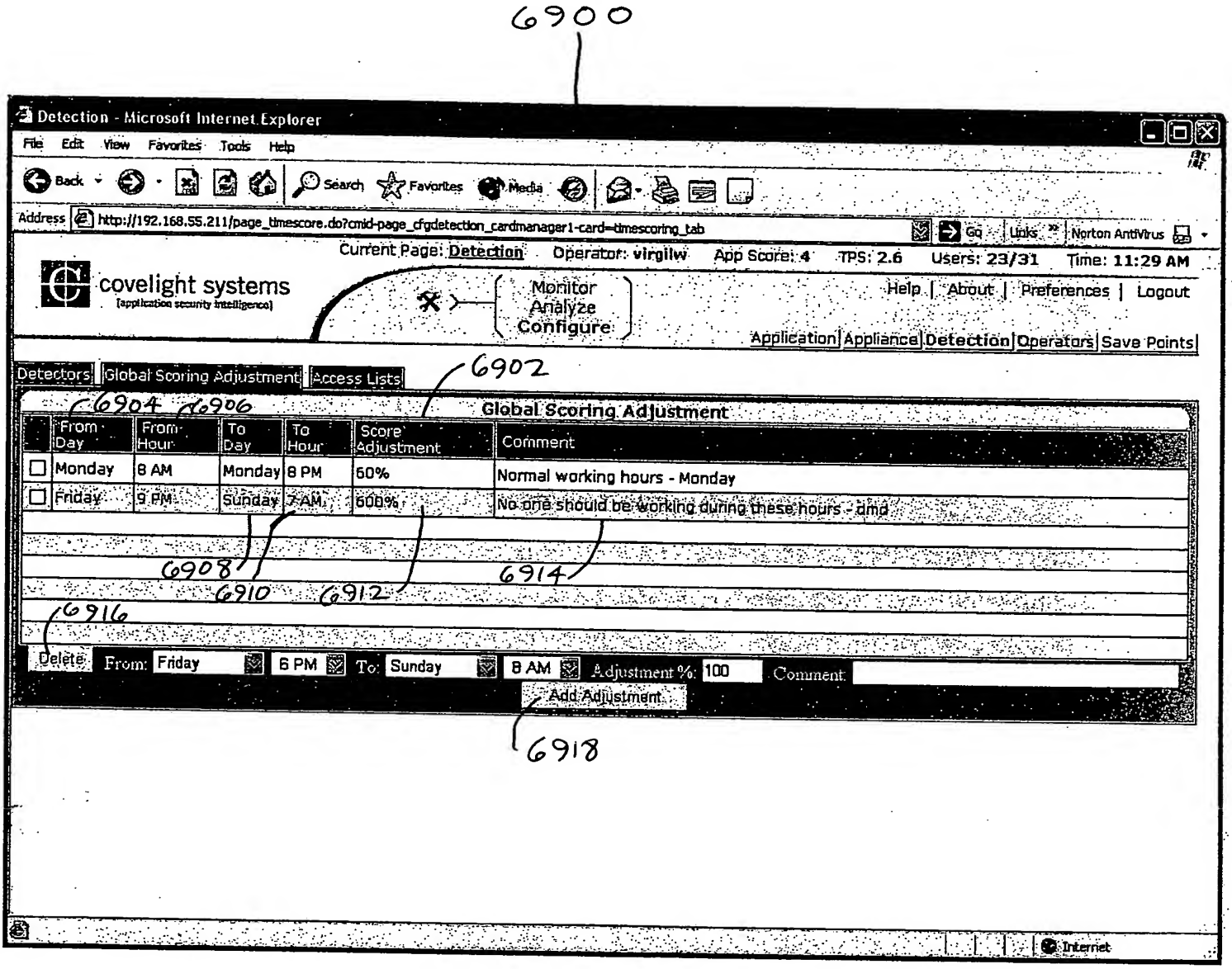
Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

FIG. 68



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

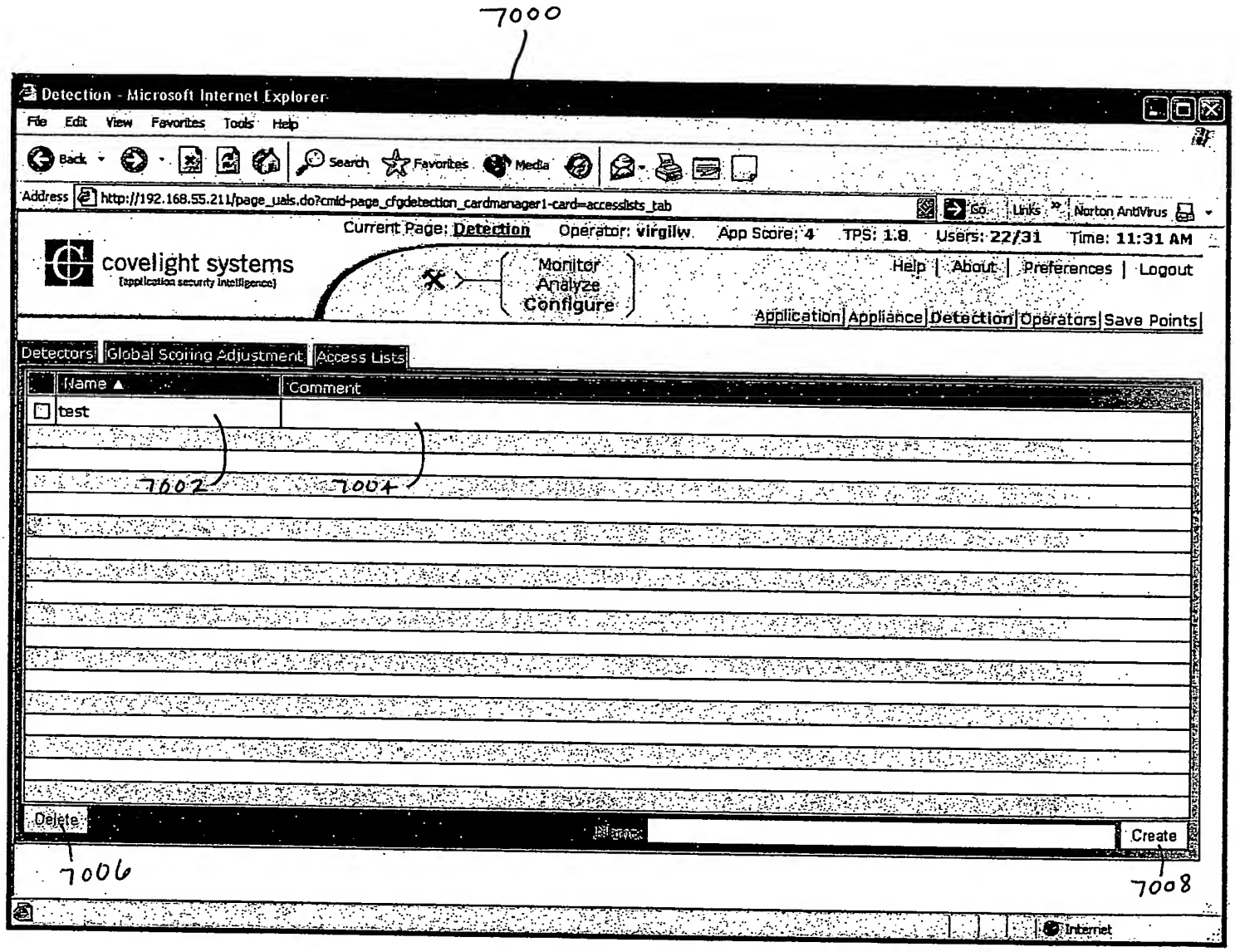
FIG. 69



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION

Atty Docket: 1503/9

FIG. 70



Title: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING PROTOCOL RESPONSES FOR A SERVER APPLICATION
Atty Docket: 1503/9

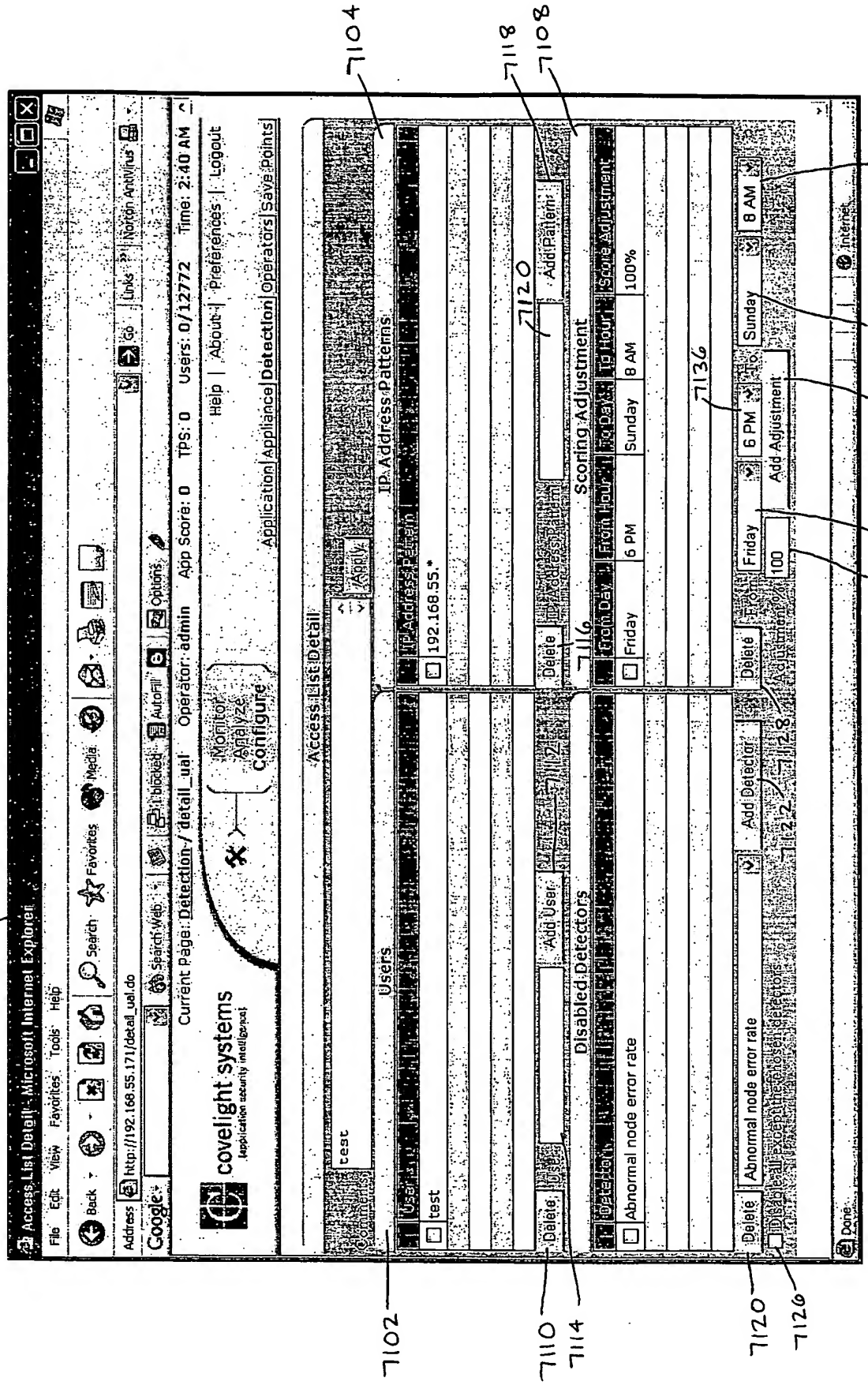



FIG. 71